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THESIS

A BENCHMARK STUDY
OF
LARGE CONTRACT SUPPLIER MONITORING
WITHIN DOD AND PRIVATE INDUSTRY

by

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March, 1994

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The purpose of this study is to benchmark DoD, large contract, supplier monitoring initiatives, specifically within the Defense Contract Management Command (DCMC), against "best practice" private industry procedures. A methodology for identification and selection of "best practice" firms was developed and acquisition procedures within Ford Motor Company, Motorola, Hewlett Packard, and Intel were reviewed. Commonalities between acquisition initiatives within these companies were identified as follows: early supplier involvement, centralized procurement, supplier monitoring and recognition, reduced number of suppliers, global sourcing, and long term contractor relationships. These initiatives were then compared to DCMC approaches and conclusions drawn regarding differences and recommendations made to improve DCMC procedures. Recommendations included; reducing DoD's supplier base through monitoring and reward, increasing use of long term supplier relationships, allowing global sourcing of products and refocusing on customer quality.

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A benchmark study of large contract supplier monitoring within DoD and private industry.

by

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Submitted in partial fulfillment
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ABSTRACT

The purpose of this study is to benchmark DoD, large contract, supplier monitoring initiatives, specifically within the Defense Contract Management Command (DCMC), against "best practice" private industry procedures. A methodology for identification and selection of "best practice" firms was developed and acquisition procedures within Ford Motor Company, Motorola, Hewlett Packard, and Intel were reviewed. Commonalities between acquisition initiatives within these companies were identified as follows: early supplier involvement, centralized procurement, supplier monitoring and recognition, reduced number of suppliers, global sourcing, and long term contractor relationships. These initiatives were then compared to DCMC approaches and conclusions drawn regarding differences and recommendations made to improve DCMC procedures. Recommendations included; reducing DoD's supplier base through monitoring and reward, increasing use of long term supplier relationships, allowing global sourcing of products and refocusing on customer quality.

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I. INTRODUCTION

A. BACKGROUND

Global competition and customer demand have made quality one of the single most important criteria for doing business today. To provide improved quality, major corporations must rely heavily on the quality of their suppliers in today's highly specialized marketplace. Truly, the quality demanded of suppliers dictates the quality of the end product. Accordingly, the techniques and criteria used to monitor suppliers in the 70's have changed dramatically in the 80's and 90's. Best value (quality) vice lowest cost has become the criterion of choice for supplier selection.

Why focus on quality? The following examples within private industry, National Aeronautics and Space Administration (NASA), and Department of Defense (DoD) illustrate the importance of quality and reliance on specialized suppliers.

1. Quality in Private Industry

The Christmas bonus for 74,000 GM workers in 1991 was a pink slip, terminating employment, stapled to their time cards. (U.S. Congress, Jan 1992, p. 19). This was not the first nor last awakening in America's automobile industry to the importance of a quality product.

Ironically, the initial reaction of the Big Three automobile makers was one of denial and a request for protectionist policy. Looking beyond the common arguments of unfair Japanese pricing and lower costs of labor and capital, Figure (1-1) shows the real reason domestic automobile manufacturers have been unable to compete, a lack of quality.

This graph is a duplicate of one presented to Congress, by the Big Three automobile manufacturers, in 1992, during a congressional hearing on urgent fiscal matters. One of the goals which the Big Three hoped to gain from this hearing was an import cap on Japanese automobiles. (U.S. Congress, Jan 1992, p. 124) An import cap never materialized, and primarily due to their superior quality Japan continues to be the Big Three's number one competitor.

This graph explains why Japanese automobile market share in the U.S. has grown to over 20% of the market. (Miller, p. A5) It also shows that U.S. manufacturers have learned the importance of quality and are making improvements. Americans both at the corporate and blue collar level realize that maintaining market share or entering new markets can only be achieved through a quality product.

Ford Motor Company is a prime example of this renewed emphasis. Realizing the importance of suppliers in improving the quality of their end product, Ford, with assistance from Dr. Deming, established a Q1 award for suppliers in 1981 and founded the American Supplier Institute a year later.

Suppliers who do not reach Q1 status in a given period of time are dropped from Ford's supplier list. Companies which achieve the Q1 rating not only receive increased business from Ford, but are highly praised in the form of referrals and free advertising. (e.g. a full page ad in The Wall Street Journal) (Raia, 1990, pp. 41-43)

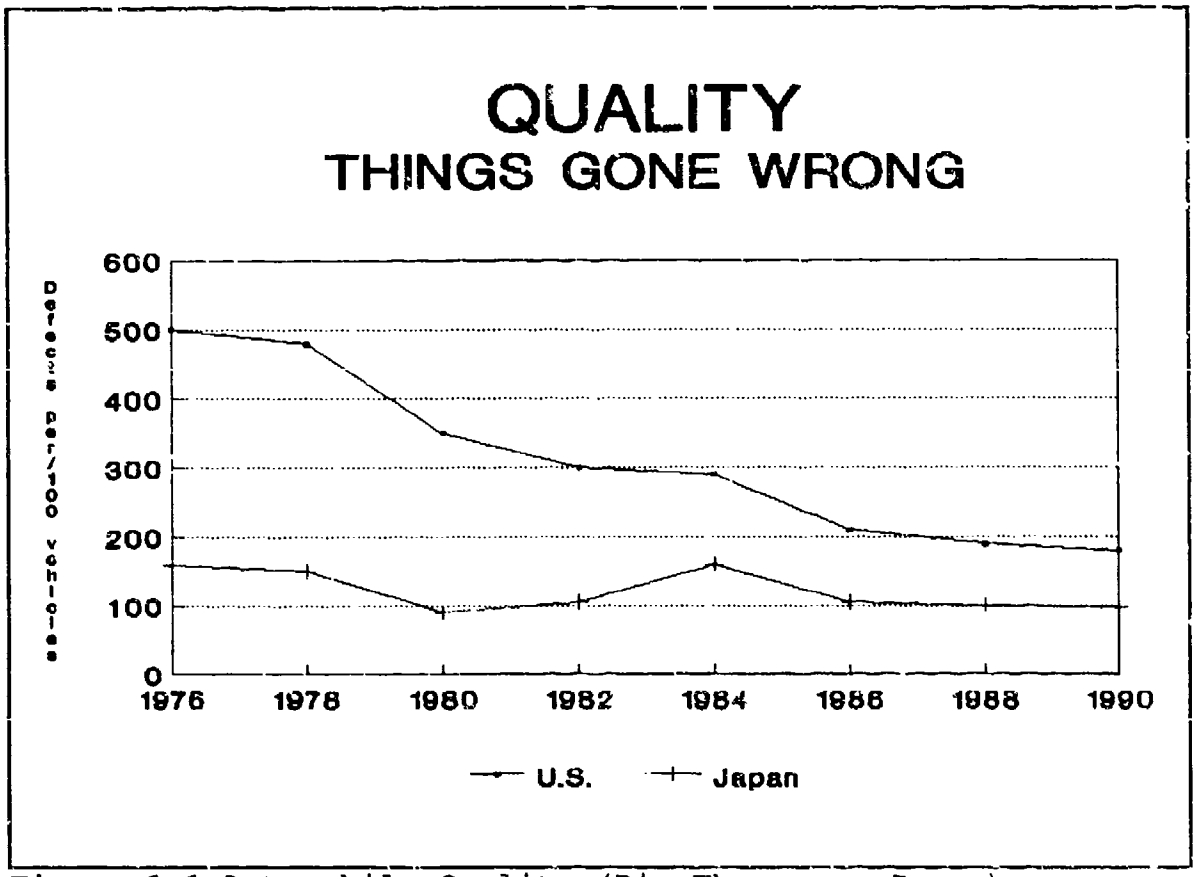


Figure 1-1 Automobile Quality (Big Three vs. Japan)

The automobile industry is not alone in its realization of the reliance on suppliers and need for quality. National Cash Register (NCR) is another prime example of this

reality. Founded in 1884, their policies centered on self-sufficiency through the early 1970's. Their early mechanical calculators were completely manufactured in-house; they had their own foundry and even made their own screws. With the advent of the computer chip, NCR was forced to change their policy or get out of the business. Today outside suppliers provide 75% of the parts which go into a much expanded range of end products. (Raia, 1989, pp. 52-53) To evaluate the quality of suppliers, NCR has a five level rating system which goes from a low (S-5) to a high (S-1). Not only is an (S-1) supplier a preferred supplier for follow-on contracts, but its products are taken directly from the receiving dock to the manufacturing line without costly in-house inspection. (Raia, 1989, p. 65)

Interestingly, NCR merged with AT&T in 1991 to jointly pursue advances in telecommunications. (Whiting, pp. 34-40)

2. Quality in NASA and DoD

The fundamental principle of reliance on private industry for major systems used by NASA and DoD, make both organizations dependent on suppliers for quality products. Two examples which illustrate this dependency are given below.

a. NASA

On the 24th of August 1993, less than a week after NASA lost contact with its billion dollar Mars probe, the CBS evening news asked the question: "Who is monitoring the

quality of NASA's subcontracts?" A preliminary investigation by NASA as to the cause of the probe's failure placed suspicion on a transistor in a clock which controlled important computer functions and was from the same lot as one which failed on the ill-fated $67 million dollar weather satellite earlier the same month. (Rosewicz, p. A12) This type of problem is not unique to NASA, the reliance on suppliers to provide quality products is pervasive throughout the Department of Defense (DoD) as well. DoD buys more merchandise than all the rest of the public sector of the United States put together. More than 30,000 firms provision DoD; of which 15,000 are prime contractors. (Thompson, P. 727)

b. DoD

After spending $2.7 billion on the Navy's A-12 program, a medium range stealth attack aircraft to replace the aging A-6, the contract was terminated for default on January 7, 1991. (GAO, p. 2) Six design and management reviews valued at $1.34 billion, with no plans for future use, were the only goods received for this expenditure. (GAO, p. 8)

Litigation with the contractors, General Dynamics and McDonnell Douglas, is ongoing to determine their liability for repayment of the $1.36 billion expenditure for which no benefit was received. While there are still many unresolved issues, this case highlights DoD's dependence on private

industry for quality products and emphasizes the importance of accurate and timely contract/supplier monitoring.

B. RESEARCH OBJECTIVES

Given the importance of supplier quality, the primary objective of this paper is to determine how DoD can monitor their suppliers most efficiently while achieving the highest degree of quality. Specific objectives which support the primary purpose include:

- Identify private industry initiatives in contract monitoring which can be applied to Government procurement.
- Determine the criteria and techniques used by "best practice" private industry to monitor contractors.
- Benchmark private industry supplier monitoring organizations against that of the Defense Contract Management Command.
- Validate manning levels for supplier monitoring based on techniques used by the best of private industry.

C. RESEARCH QUESTIONS

The primary research question, which addresses the objectives listed above, is: Which "best practice" industry initiatives, in monitoring large contract suppliers, can be applied to Government contract administration? Secondary questions which flow from this analysis include:

- Which criteria are used to monitor supplier performance in private industry?
- How often does private industry review suppliers for contract conformance based on their criteria?

- Which factors are used to determine the manning level and organization for contract monitoring in private industry?

D. SCOPE OF RESEARCH

Focused on "best practice" supplier quality initiatives in private industry, this research will give particular attention to the process or processes used to monitor supplier performance on large contracts. Large contracts in this research refers to any contract with a total dollar value exceeding $25,000.00. This statutory level within DoD separates large and small contracts; consequently, it was used to distinguish large and small contracts for the purpose of this study.

From the processes used to monitor large contracts, initiatives which appear most relevant and transferable were selected and their applicability to Government contract administration assessed. Because most DoD contract administration is consolidated under the Defense Contract Management Command (DCMC), this activity will be used as the primary point of comparison between Government and private industry practice. Existing supplier quality programs within DCMC, primarily the Process Oriented Approach to Contract Administration Services (PROCAS) and In-plant Quality Evaluation (IQUE), will be analyzed in depth. Further, the DCMC Organization structure will be reviewed and suggestions

made to strengthen the organization based on "best practices" from private industry.

E. RESEARCH LIMITATIONS AND ASSUMPTIONS

1. Limitations

The primary limitation with this type of research is the quantity and availability of benchmark data. This is particularly true within private industry, as there is no incentive for industry leaders to give information to firms who may become their toughest competitors.

For the Government, although the threat of competition does not exist, firms of adequate size, with similar contract types and dollar values are very few, limiting the number of firms which can be chosen. At the other extreme, a limitation inherent to benchmarking is the possibility that a firm which does closely parallel DoD's procurement system may be overlooked.

2. Assumptions

An assumption made throughout this document is that the benchmarking process for "best practice" firms accurately selected those with the most applicability for DoD. In benchmarking, it is critical to identify the best in the industry and ensure that the sample selected relates directly to the organization conducting the study.

F. SUMMARY

Chapter I demonstrated the importance of quality, and showed the heavy reliance on suppliers to deliver quality end products. In addition, it introduced the key focus of this research--comparing large contract monitoring procedures in private industry to their DoD equivalent DCMC.

To facilitate this comparison, Chapter II will give background information on: benchmarking, the concept of "best practice," Malcolm Baldrige Quality Award Criteria and Purchasing Magazine's Medal of Professional Excellence. Additionally, firms used to conduct this study are introduced and an overview of DCMC given. Chapter III will then describe how: data were collected, the benchmarking methodology applied to this research and "best practice" firms were selected.

Chapter IV presents the data, and Chapter V analyzes common initiatives in "best practice" firms and compares and contrasts these initiatives with DCMC procedures. Finally, Chapter VI concludes this study with conclusions, recommendations to improve DCMC's contract monitoring processes, summary answers to the research questions identified and recommendations for further research.

II BACKGROUND

This chapter looks at specific background issues which require clarification. It first defines benchmarking, a concept central to this study, and then outlines how the concept of "best practice" will be used. Tied closely to the definition of "best practice," as applied in this study, selection criteria for the Malcolm Baldrige National Quality Award and Purchasing Magazine's Medal of Professional Excellence will be discussed.

Additionally, introduction information is given on firms selected for research including: selection criteria, approximate size and main line of business (i.e. manufacturing, services, retail, etc). Similar information about DCMC follows the list of firms selected. This background review sets the stage for the presentation and analysis of data received.

A. BENCHMARKING

Benchmarking is a popular process in the business sector brought on by ever increasing competition. Companies want to know what their competitors are doing and hope to improve their own internal processes by adopting ideas from their competition. Purchasing magazine describes benchmarking as

> "...a systematic approach or process to drive change into an organization. It arrives at change by doing process-to-

process comparisons and developing data about performance output level for the process. In other words, it is the search for those practices that lead to superior performance. (Graham, p. 64)

Figure (2-1) shows the steps in the benchmarking process. (Graham, p. 64) Each step must be tailored to the organization initiating the benchmarking process. The actual methods used to tailor this process to DoD are outlined in Chapter III. However, because the first step in the process requires selection of "best practice" firms with which to benchmark, information on "best practice" and the two central evaluation criteria used to make that determination in this research are outlined below.

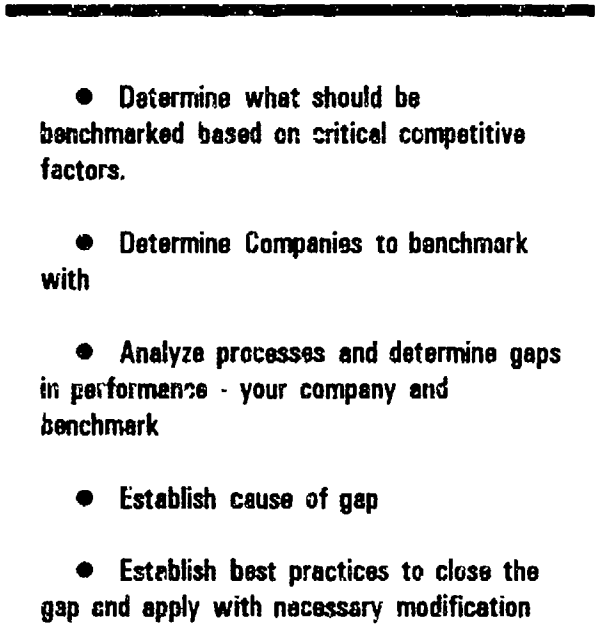


Figure 2-1 Process Benchmarking Model

B. DETERMINING "BEST PRACTICE" FIRMS

The most critical decision in any benchmark or comparative study is determining industry leaders in the critical competitive factors. Recent management theory places a great

deal of emphasis on buying and supplying quality products and how to identify "best practice" suppliers.
(Weber & Johnson, pp. 1-19) Background information on the two evaluation criteria used in this study to define "best practice"--the Malcolm Baldrige National Quality Award and Purchasing Magazine's Medal of Professional Excellence--are discussed below.

1. Malcolm Baldrige National Quality Award

The Malcolm Baldrige award, named for a former Secretary of Commerce (1981 to 1987), was created by Public Law 100-107 on August 20, 1987. Since then there have been 17 recipients who have demonstrated, through extensive examination, a superior commitment to quality in seven different examination categories. Examination categories together with the maximum points possible for each category are shown in Figure (2-2). Each category shown is subdivided into greater detail. Further, participating companies are broken down into three categories--manufacturing, service and small business. Based on the examination criteria and company category, the qualifying inspection is carried out by a team certified by the National Institute of Standards and Technology (NIST) and the American Society for Quality Control (ASQC). (NIST)

Of these three categories only companies in the manufacturing category were considered to benchmark with

DoD's contract administration organization. This list includes; Westinghouse Commercial Nuclear Fuel Division, Motorola, Xerox, Miliken & Company, IBM, Cadillac Motor Car Company, Solectron Corp, Texas Instruments, and AT&T Network Systems Group (Transmission Systems Business Unit). Of these, only Motorola was selected for this research because of their size and the distinction of also being a recipient of Purchasing magazine's Medal of Professional Excellence.

2. Medal of Professional Excellence

The Medal of Professional Excellence is awarded each September by Purchasing magazine to the single firm which has demonstrated the highest degree of professionalism and result-oriented procurement performance throughout the year. From 1990 through 1993, in sequence, these firms included: Ford, Motorola, Hewlett-Packard, and Intel. Each of these firms met

Examination Category	Points
1.0 Leadership	95
2.0 Information & Analysis	75
3.0 Strategic Quality Planning	60
4.0 Human Resource Development and Management	150
5.0 Mgmt of Process Quality	140
6.0 Quality and Operational Results	180
7.0 Customer Focus & Satisfaction	300
Total Points	1,000

Figure 2-2 Malcolm Baldrige Award Criteria

the criteria outlined in Chapter III, and accordingly, will be used as "best practice" firms for the purpose of this paper.

C. INTRODUCTION OF "BEST PRACTICE" FIRMS SELECTED

Table (2-1) lists the selection criteria, approximate size, and main line of business for each firm selected.

TABLE 2-1 INTRODUCTION OF BEST PRACTICE FIRMS

Firms	Selection Criteria	Approximate Size	Main Line of Business
Ford Motor Company	1990 Purchasing Medal of Professional Excellence	Sales-$88.3B Employs-332K	Automobile Manufacturing
Motorola INC.	Malcolm Baldrige Award Winner (Manufacturing)	Sales-$11.34B Employs-102K	Communication Systems & Semiconductors
Hewlett Packard	1992 Purchasing Medal of Professional Excellence	Sales-$14.49B Employs-91,300	Computer & Computer Peripheral Market
Intel Corp.	1993 Purchasing Medal of Professional Excellence	Sales-$5.84B Employs-25,800	Electronics Computer Chips

D. DCMC ORGANIZATION

Project 60, a comprehensive study of defense wide procurement, initiated in 1962 by Secretary of Defense (Robert McNamara), was the seed which grew into the current Defense Contract Management Command. Bolstered by the cost cutting success of consolidating Air Force, Army, and Navy supply functions into the Defense Supply Agency (DSA) in 1961, Secretary of Defense McNamara saw the consolidation of Service

wide contract administration functions as a logical next step. (Mastin, p. 14) Consequently, Secretary of Defense Project 60 was established to explore the best way to consolidate the contract administration function.

The charter of Project 60 was to:

> Propose a plan for establishing uniform field contract management covering all contract management functions such as quality control, review of subcontracting practices, property administration, industrial security review, price proposal review, etc. Provide alternate plans for placement of contract management and organization therefore within the Department of Defense. (DoD Project 60, P. 5)

The study itself was conducted by 84 seasoned Government personnel separated into 13 task forces; each assigned an area for review corresponding to their expertise. In 1963, after a year of concentrated effort and some 337 visits to 171 various Air Force, Army, Navy, DSA, and NASA activities a four volume report was forwarded to the Secretary of Defense. (Mastin pp. 12-13). The report included 25 recommendations, foremost of which was the establishment of a Defense Contract Management Agency which reported directly to the Secretary of Defense. (DoD Project 60, P. 13)

Duplication resulting from non-uniformity between Service branches in procedures employed for review of contractor internal management systems such as accounting, purchasing, and estimating was the primary justification for this recommendation. An example used to illustrate this problem was an identical antenna procured from the same source by the

Army, Air Force, and Navy. The antenna was classified unclassified by the Army, confidential by the Air Force, and secret by the Navy with a range in price from six to twelve dollars. (Project 60, p. 48)

Interestingly, Project 60 did not directly address the reasoning behind separation of contract award and administration. In fact the report said:

> For the purposes of Project 60, it was determined that contract management would be treated as a functional area which can and should be distinguished from those functions usually accomplished by the buying center or program office prior to the award of a contract. The merits of this approach used predominantly by the Air Force and the Navy, can be debated by proponents of the alternate method of combining the buying and contract management functions into the same office and approaching the entire job with the same group of people. (DoD Project 60, p. 6)

By adopting this philosophy Project 60 greatly strengthened the argument for separating these functions and tacitly endorsed this philosophy by recommending a separate defense contracts administration organization.

In January 1966, only three years after Project 60 recommendations were published the Defense Contract Administration Services (DCAS) came into existence. Organizationally, it reported directly to DSA vice becoming a separate organizational entity. Operationally, DCAS was separated into 11 geographical regions with local agencies responsible for covering the entire United States. (Mastin. P. 19)

Today DCAS is the Defense Contract Management Command (DCMC) a branch of the Defense Logistic Agency, formerly DSA, and is the primary organization for the administration of DoD contracts.

The present day organization has seen dramatic and constant change over the past three years. In 1990 the organization name changed from DCAS to DCMC and its contract administration role expanded. The change was a result of the 1986 Packard Commission study which pointed out the duplication of contract administration functions conducted by Service plant representative offices at major weapon system manufacturers. Based on a Packard Commission recommendation, DCMC took over Air Force, Navy, and Army plant representative offices and consolidated them into Defense Plant Representative Offices (DPROs).

The next major change occurred this year as a result of DCMC's new focus on teaming and customer satisfaction. Using the teaming concept, DCMC headquarters reorganized internally into process action teams to improve customer support.

In 1993, DCMC has over 400,000 prime contracts in house with a face value of $800 billion. These contracts represent over 25,000 different contractors and require a work force of 19,600 civilian and 690 military personnel to manage. (DCMC Brief)

E. SUMMARY

This chapter defined benchmarking and "best practice," two concepts which are dominant throughout this study. Additionally, selection criteria for the Malcolm Baldrige National Quality Award and Purchasing Magazine's Medal of Professional Excellence were discussed. Finally, "best practice" firms were introduced along with background information on DCMC.

Chapter III will describe how data for conducting this research were acquired and outline how the process benchmarking model will be applied to the data collected. Further, background information on the concept of "best practice" and both the Malcolm Baldrige Quality Award and Purchasing Magazine's Medal of Professional Excellence will be used to explain the methodology for selection of "best practice" firms selected for this study.

III METHODOLOGY

The methodology chapter is made up of two sections. Section A describes how research data were collected. Section B details how the benchmarking and "best practice" concepts, introduced in Chapter II, are used to interpret the data collected.

A. DATA COLLECTION

The basic research data used in this report were acquired in the following manner: review of current literature, interviews with DoD and civilian personnel, and survey data. Each of these areas is expanded below and mention made of the most significant contributors of data.

1. Literature Review

While there is an abundance of information on quality topics and "how to" books on benchmarking, very little data were available on the actual purchasing operations of companies to be reviewed. The only relevant source of written data on purchasing organizations came from Purchasing magazine. Its articles, particularly on Medal of Excellence Award Winners, provided an ideal source of information for benchmark purposes.

Another excellent source for general reference material was the Monterey Institute for International Studies

library. Through CD-ROM technology, they subscribe to a data base titled Pro-Quest which allows users to search for key words in brief summaries of recent journal and newspaper articles. This data base is periodically updated and proved to be very current and informative.

2. Interview Data

Interviews became the primary source of data for information within DoD. Initially, surveys were envisioned for use both within the private sector and DoD for data collection. However, after faxing a proposed survey copy to DCMC headquarters, their recommendation was to solicit data by phone and personal interview. (Toda)

Assisting in this effort, the head of DCMC's Customer Outreach Program was most helpful in both answering research questions and providing follow-on points of contact within their organization. Personnel in charge of monitoring contracts for NASA, Naval Sea Systems Command (NAVSEA), and inventory control points were contacted.

Interviews with private industry were used to supplement information from literature review and gain valuable insight into the overall organization. Personal interviews were conducted with Intel and Hewlett-Packard procurement managers and a phone interview made with the head of procurement for Motorola's Government Electronics Group.

3. Survey Data

The lack of response on surveys (Appendix A) made it obvious that getting detailed survey information is difficult, and led to a more aggressive search for information through personal interviews and telephone calls. Of seven surveys sent only one returned with a substantive response, Hewlett-Packard. Two other firms responded by letter declining to participate, and no response was received from the remaining four firms surveyed.

A recommendation to future researchers is to select topics where data are available without the use of a survey, or if a survey cannot be avoided, structure the questions with multiple choice type responses which minimize completion time.

To summarize, heavy emphasis was placed on existing literature for research of "best practice" firms along with survey and interview data. Much less written data were acquired on DCMC placing a greater reliance on phone interviews and a plant visit to the Defense Contract Management Area Office for San Francisco.

B. METHODOLOGY FOR DATA ANALYSIS

Two methodologies key to this research are the application of the process benchmarking model, and the selection process for "best practice" firms. Each of these concepts were introduced in Chapter II; however, description of their specific application to this research is described below.

1. Application of the Process Benchmarking Model

Each of the five steps of the Process Benchmarking Model, shown in Figure (2-1), are listed below and their specific relationship to this study defined.

a. Determination of Critical Competitive Factors

The primary critical competitive factor in this study is the initiatives used by "best practice" private industry to monitor large contract suppliers. Additional critical factors which will be considered include: criteria and monitoring techniques used by private industry, design of their procurement organizations, and manning level criteria. In accordance with the model, these factors are selected by the initiator or the study based on their anticipated value to the organization.

b. Determining Companies to Benchmark

Next to selecting the right criteria, this is the most critical step in benchmarking. Accordingly, it is discussed at length in a following section on selection of "best practice" firms.

c. Analyzing Processes and Determining Gaps

The process analysis outlined in this step is the topic of Chapter V. In brief, commonalities will be drawn between initiatives of "best practice" firms, and then compared and contrasted with DCMC procedures. This procedure

will highlight DCMC initiatives which are on the leading edge of industry practice and identify areas where gaps exist.

d. Establish Causes of the Gaps

Causes of gaps will be explained in the section of Chapter V which contrasts DCMC with private industry. Additionally, some causes, defined as barriers to implementation, will be presented with recommendations for improvement in the final chapter.

e. Establish Best Practices to Close Gaps

This final step in the benchmarking model implements "best practice" initiatives to improve performance. For the purpose of this study, final step requirements will be met in the closing chapter with recommendations to improve the DCMC monitoring system.

2. Determination of "Best Practice" Firms

A critical decision, in any benchmark or comparative study, is determining industry leaders in the critical competitive factors. Since this study is aimed at improving the contracting monitoring function within DoD, the goal is to find comparable "best practice" procurement organizations within private industry. Because there are few, if any, private firms which match DoD in buying power and procurement diversity this proved difficult. Compounding this difficulty was the need to clearly distinguish firms who resemble the Government and are industry leaders in procurement practice.

To assist in making these determinations, recommendations were solicited from two firms in the benchmarking business--Prism Research and Gongos & Associates. Prism Research is located in Cleveland, Ohio and Gongos and Associates, founded in 1990, is located in Auburn Hills, Michigan. Both firms were asked how they determined "best practice" firms when conducting benchmark studies.

Prism Research stated that they do internal surveys with companies in the same industry as their client company, and use the results to rank firms in order of best overall practice. A sample of the survey criteria included: the scope of their service, strategic importance of the service provided, customer satisfaction, cost, etc. (Deshpande)

Gongos Associates said they have no set strategy for determining "best practice" firms and they conduct benchmark studies only with companies designated by their customer. Their feeling is customers know who their competitors are; making a separate determination not required. (Krug)

This study applies a combination of both approaches, by focusing on firms which are identified as "best practice" and are large in size, analogous to what a DoD competitor might be in private industry. As DoD has no equal in size or direct competition, size as a criterion is used here as a best approximation. For this research, "best practice" firms are either a Malcolm Baldrige Quality Award winner or a recipient of Purchasing magazine's Medal of Professional Excellence.

Additionally, firms selected must have annual sales in excess of $5 billion.

C. SUMMARY

Chapter III explained the methodology used for collection and analysis of data. Collection methodologies included: review of current literature, interviews with DoD and civilian personnel, and survey data. Analysis of data collected will be done using the five steps of the process benchmarking model. A critical factor of the model, the selection of "best practice" firms, was based on firms which are proven performers and comparable to DoD in scope. Proven performers were further defined as either a Malcolm Baldrige Quality Award winner or a recipient of Purchasing Magazine's Medal of Professional Excellence.

Next, Chapter IV will introduce data acquired on "best practice" firms and DCMC.

IV DATA PRESENTATION

Data collected on general contract management trends, the supplier monitoring process, and the procurement organizations within each "best practice" firm selected in Chapter II are presented below. For the ease of the reader, and facilitation of the benchmarking process, the same information with regard to DCMC is presented in the final section of this chapter.

A. PRIVATE INDUSTRY DATA

The data for each of the firms described below will be presented in the same basic format. The purpose is to give the reader a sense of comparison between companies and set the stage for the analysis in Chapter V which will draw commonalities between approaches of different firms. Interestingly, whether dictated by the market place, achieved independently, or through their own benchmarking initiatives, the supplier management strategies of these companies have a great deal in common. In order the firms reviewed here will include Ford, Motorola, Hewlett Packard, and Intel.

1. Ford Motor Company

Ford Motor Company has taken an aggressive stance on quality which is paying off in improved market share and better profits. Since 1980 the quality of their product,

measured by reported defects, has improved 70% making them the leader of the Big Three. (Raia, 1990, p. 41) Quality does pay, of the top ten selling vehicles in the United States for 1993 eight are domestic and five of these are Fords. (Zino, p. 8)

a. *Contract Management Trends*

With a 1990 purchasing budget of $50 billion, Ford is keenly aware of the role suppliers play in the quality of products. The following is a paraphrased list of contract management initiatives which Ford has instituted to compete in today's market. (Raia, 1990, pp. 41-42)

- Globalization of supply base. In 1990 $15 billion of Ford's annual budget was spent on overseas sources. With a global market, finding the right technology and price means looking at all possible sources.
- Optimization of supply base. Since 1980, Ford has aggressively trimmed its supplier base. From 1984 to 1990 maintenance, repair, operating suppliers were reduced from 7,000 to 3,000. Ford's "Q1" program has been the key to this initiative.
- Long-Term contracts. Over 70% of Ford's suppliers are under three to five year contracts.
- Single-sourcing. A highly controversial approach, Ford has moved aggressively in this direction. Most of their production parts are purchased from a single source under a long term contract.
- Early supplier involvement. Starting with the Ford Taurus in the 1980's, heavy emphasis has been placed on team design work with suppliers. Today an estimated 70% of Ford's total procurement budget goes to suppliers involved with concurrent engineering. Concurrent engineering refers to suppliers who assist in engineering parts while the end product is still being developed at Ford.

b. Supplier monitoring Process

In addition to the initiatives above, Ford has three separate quality programs aimed at improving the quality of suppliers: Q1, Total Quality Excellence (TQE), and Supplier Quality Improvement (SQI). Established in August 1981, with advice from Dr. Deming, the Q1 program became the tool by which Ford culled out non-performers from its supplier base. Today, a supplier of production parts must be Q1 certified to do any business with Ford. This certification is extended to a specific manufacturing location which forces each plant of a major supplier to stand on its own merit.

A follow-on program to Q1, TQE was initiated in 1987 to assess all levels of a suppliers operations from engineering ability to delivery and commercial performance. Unlike Q1, the TQE award is given on a commodity basis vice a particular plant. To qualify suppliers must be Q1 certified and be able to document continuous process improvement and present an assessment of their core business areas; product quality, engineering, delivery, and commercial viability. This self assessment is then analyzed by the Ford buyer assigned to that commodity and compared with Ford's internal assessment of the supplier. If the supplier scores above 90% in each of the four areas they are eligible for the TQE award. By the end of 1990 seven suppliers had fully qualified under this standard. (Raia, 1990, pp. 52-53)

Recognizing that many suppliers did not have the in house capability to improve their processes, Ford took a tip from Mazda (25% owned by Ford) and established a technical assistance branch within their buying activity called Supplier Quality Improvement (SQI) in 1987. The SQI team consists of over 100 technical specialists whose primary responsibility is to assist suppliers in early product design and quality improvements. (Raia, 1990, p. 52)

c. Procurement Organization

Ford has a highly centralized purchasing organization broken down into three areas of operation: North American Automotive Operations (NAAO) which manages production purchasing for all North American body and assembly plants, Diversified Products Operations which handles purchasing for a wide array of automotive and non-automotive businesses, and International Operations which handles all of Ford's overseas procurement. Key points to note in this organization are its emphasis on economy of scale buys and division of labor by commodity within each area of operation.

2. Motorola

Finding itself surrounded by Japanese competition for market share, Motorola saw the need for quality earlier than many of its fellow U.S. companies. In 1981 they began a drive to improve quality by tenfold, then by a hundredfold, and finally developed a six sigma quality goal which has

become a trademark. In simplest terms, six sigma means no more than 6.8 defects per million component parts.

Their hard work and innovative approach to quality has paid off dramatically. Motorola has expanded its sales outside the U.S. to 44% of its total revenue vice 25% in 1985. (Raia, 1991, p. 1)

Throughout the improvement process, Motorola is certain that aggressive contract management has been invaluable. Their unique approach to contract management is outlined below.

a. Contract Management Initiatives

The following are paraphrased initiatives from Purchasing magazine on how they achieved their success. (Raia, 1991, pp. 38-41)

- Willingness to learn best-in-class practices. To quote management "We are born benchmarkers."
- Sharing their innovative techniques with suppliers through technical assistance and education offered at their own university. (Motorola University)
- Setting the same aggressive goals for suppliers as they impose on themselves.
- Developing a consistent approach among decentralized business units with regard to assessment of supplier performance.
- Instilling what they call a Quality System Review (QSR) guideline with suppliers which enables suppliers to do self assessment on their product and performance.
- Centralizing market research data gathered throughout the various branches of the organization to act as a central reference point.

- Reducing the supplier base through supplier monitoring and weeding out suppliers who fail to show continuous improvement. The supplier base has dropped from an estimated 4,200 in 1985 to 1,155 in 1991.
- Insuring early supplier involvement with emerging projects by letting suppliers actually participate in the design of new components.

b. Supplier Monitoring Process

Critical to the success of the initiatives listed above is the close monitoring of suppliers for conformance to the rigid quality standard Motorola requires. To accomplish this, Motorola implemented a system aimed at determining the total or true cost of a product. Titled economic index, they devised a mathematical system based; 50% on quality (measured in defects in parts per million), 30% on late delivery, and 20% on early shipments. The goal of the index was to calculate the cost to Motorola of suppliers who failed to conform with contract requirements. The best score a supplier can receive is 1.0; this means that the actual contract price was the true cost to Motorola. In other words, no additional costs were incurred as a result of suppliers who violated one of the index criteria.

Suppliers who achieve a score lower than a steadily decreasing annual cut-off are eligible for supplier awards and follow-on business. Failure to lower scores over time is used as a tool to weed-out suppliers who do not show improvement. (Raia, 1991, p. 44)

Another key facet of Motorola's supplier management is their emphasis on training and working with suppliers. Their corporate philosophy embraces close working relationships with suppliers and a mentor-protege approach to their development. To achieve this goal they have set up a university for training and a Quality System Review (QSR) program.

Motorola University, founded in the late 1970s, was originally designed to improve the skills of only Motorola employees. Realizing the need for similar training for their suppliers and the inability of many smaller companies to internally sponsor such training programs, Motorola offered courses to suppliers at reduced rates. The communications sector, within Motorola, found this training so effective that they require all of their suppliers to attend courses in the following areas: design for manufacturing, design for assembly, cycle time, and statistical process control.(Raia, 1991, p. 50)

The QSR program is defined as an audit which looks at "...the collective plans, activities, and events that are provided to ensure that products, processes, and services will satisfy customer needs." (Raia, 1991, p. 47) Like their University, when QSR(s) were initiated in 1981 their purpose was to improve only internal quality. In 1989; however, Motorola began using the same plan to assess the quality of their suppliers. By 1991 they completed audits on

approximately 500 suppliers. Key suppliers can now expect an audit every other year and are required to submit a corrective action plan for areas which fail to qualify.

c. Procurement Organization

Motorola is a highly decentralized organization, comprised of business units called sectors, and groups which operate as business units within sectors. Consequently, each group has its own design, engineering, manufacturing, and purchasing staff.

The purchasing department at Motorola's Automotive and Industrial Electronics Group in Seguin, Texas, a typical purchasing department organization, consists of six commodity teams. Each team is responsible for the procurement and quality evaluation of suppliers within their general commodity area. As a purchasing department, the Seguin team introduced a "dock to stock" program which eliminated over 70% of incoming supplier inspection. This reduction was achieved through certifying suppliers, and then relying on the effectiveness of their internal quality controls to preclude costly reinspection of material upon receipt. (Raia, 1991, p. 45)

A corporate buying department was established in the early 1980's, at the corporate level, to capitalize on economies of scale. Staunchly resisted at first, the significant savings passed along to participating groups,

quickly reversed this view. A prime example were the millions saved when Motorola centralized capacitor procurement, a $460 million annual purchase. Part of these savings came from reducing the supplier base for capacitors, through the quality process, from an industry wide 108 to only three corporate suppliers. (Raia, 1991, p. 43)

Mr. Larry Burleson the head of Motorola's Government Electronics Group, approximately 60 buyers with a $200 million annual outlay, in Scotsdale Arizona, gave some additional insight into their purchasing operation. He was asked to explain: whether contract award functions were separated from management functions, how efficiency was measured among buyers, what quality measurements were used to assess supplier performance and the relative importance to his organization of noncompetitive follow-on awards, long-term contract relations and global sourcing for suppliers.

Motorola does not separate the contract award function from contract management. Even though a good percentage of their contracts are centrally procured, the actual contract award takes place only after a meeting of the concerned groups who agree on award criteria. Subsequent to award, it becomes the responsibility of the procurement commodity managers within the concerned groups to monitor the contract for performance and complete administrative functions. Essentially this allows the group level commodity

teams complete control of the contract from award through final payment.

This concept of complete control followed nicely with what Mr. Burleson described as direct-line management. The term direct-line management refers to a commodity buying teams direct responsibility for the procurement needs of an entire product or production line. He explained that his buyer teams are as small as two or large as ten depending on commodity, and include both design and quality engineers. The teams focus on the process and are concerned with every aspect of product development.

In assessing the efficiency of individual buyers Mr. Burleson stressed that individual appraisals at least in part are tied to the effectiveness of the team. He added that each buyer does have separate goals and objectives tailored to the individual but stressed that these objectives were more qualitative than quantitative.

Statistical sampling of incoming material was stressed in evaluating supplier performance. Mr. Burleson related that of the 1200 suppliers he deals with, down from over 3000, each receives a monthly report card showing initial inspection rejects, production line reject rates and any customer returns where their product was defective. This type of monitoring provides the data necessary to calculate six sigma quality described earlier. On the topic of suppliers,

Mr Burleson went on to say that of the 1200 suppliers 95% of their business is with 300 or less.

The importance of awarding follow-on contracts based on past performance was stressed as a critical advantage when evaluating the relative importance of noncompetitive awards, long-term contracts and global sourcing. Mr. Burleson sees early supplier involvement in the design phase as a critical part of their companies success. He went on to say that suppliers who commit themselves to assisting in the development stage of an end product do so with the knowledge that they will receive the follow-on work. Long-term contracts were viewed as a natural vehicle for maintaining close working relationships with suppliers and facilitating early involvement in product design.

Mr. Burleson pointed out that this is significantly different from Government contracting for major weapon systems where the initial design, prototype engineering, and manufacturing are bid competitively and often done by different companies. He went on to say that while the dollar amount of the actual contracts awarded in each of these phases may be lower the separation of these functions leads to costly transition problems which drive up the total cost.

On the issue of global sourcing, his feeling was that in the current day global economy it is almost impossible to discern the country of origin of a given

product. He explained this view by saying the raw materials for a product may come from Japan the processing work done in the United States and the major corporate stockholders are from Taiwan. This type of fragmented control makes the concept of buy American obsolete.

Because of his close relationship with DCMC as a primary Government source of supply, Mr. Burleson gave some final comments on what he sees as areas where the organization needs improvement. Foremost of these was the feeling that Government contracting representatives, both in initial procurement and administration, are inundated with regulations. He related that Government representatives are overly concerned with making procedural mistakes and constantly documenting their decisions to satisfy outside auditors, like the Inspector General. He added that the focus on competing every contract has prevented the Government from taking advantage of long-term relationships critical to overall effectiveness.

In closing, he pointed out that Government weapon systems research and development funding no longer drives the cutting edge of technology. He added that the Government must find ways to use emerging commercial technology in their programs if they want to maintain a technological edge. This is in opposition to the existing approach where suppliers build custom parts to Government specifications.

3. Hewlett-Packard

Hewlett-Packard (HP) has enjoyed tremendous success in carving out a niche in the computer and computer peripheral market. While other computer related companies have experienced a slump, HP continues to enjoy high profit margins and dominates the market in ink and laser jet printers. When asked of the importance of procurement in carrying out this success, HP's CEO, Mr John Young, had this to say:

> Material cost reduction is very near the top of HP's list of 'must' objectives. Every aspect of procuring materials must be managed expertly and can be achieved only after serious and demanding negotiations with our suppliers. Our procurement people are embarking on these negotiations with the unwavering objective of providing HP with the best supplier performance in the industry. (Raia, 1992, p. 32)

Linked with supplier performance is HP's emphasis on quality. HP saw a 10-fold improvement in product quality during the 1980s primarily from improved supplier management. To better understand the mechanics of their approach to suppliers, this section will again look at the contract management initiatives, supplier monitoring process, and the procurement organization within HP.

a. Contract Management Initiatives

A 1992 article in Purchasing magazine, which awarded Hewlett-Packard the Medal of Professional Excellence, listed six key reasons for their purchasing success. The following is an abridged version of each: (Raia, 1992, pp. 32-36)

- Top management support for strategic planning in attaining purchasing goals.
- Centralizing buying power in a highly decentralized organization.
- Development of close strategic alliances with suppliers of leading-edge technology.
- Global sourcing of desired goods. To quote one corporate procurement executive "If you're not able to buy from all over the world, you do not have an effective purchasing department."
- Quality. During the 1980's an estimated 10-fold improvement in quality was achieved.
- Strategic sourcing through the following activities: development of a written strategy, gaining division involvement and consensus, firm fair supplier negotiations, ensuring contracts contain the results of negotiations, ensuring contract compliance.

b. Supplier monitoring Process

Not surprisingly, Hewlett-Packard has a specially designed software package, titled procurement management information system (PROMIS), for handling all the facets of purchasing (Figure 4-1). This system forms a vital link between highly diversified divisional procurement shops and the corporate purchasing department. The goal is to present a consolidated front to suppliers. Divisions can negotiate with confidence if

- **Maintain procurement specification data and related supplier information.**
- **Update purchase contract activity and changes from sourcing plan.**
- **Maintain supplier performance information.**
- **Electronically transmits orders and forecasts to suppliers.**

Figure 4-1 PROMIS Functions

they know the weight of corporate contracting is on their side. To further enhance this policy, corporate procurement conducts a quarterly procurement strategy board (PSB) where the best minds in the business exchange ideas on how to improve the process. A critical part of the PSB process is an assessment made of key suppliers in the areas of: technology, quality, responsiveness, delivery, and cost. Listed in order of importance, this assessment is referred to as simply TQRDC by HP procurement staff. Once this assessment has been made, strategies for future procurement plans are made, by commodity, with TQRDC qualified suppliers. (Raia, 1992, p. 37)

c. *Procurement Organization*

HP is highly decentralized, like many major manufacturing entities since the late 80's. It has plants in 25 different U.S. cities and 16 foreign countries. As mentioned earlier, the benefits of centralized procurement are not lost just because the company is decentralized. In fact, the corporate procurement branch takes the initiative in major commodity buys and sets the strategy for divisions to follow. Accordingly, their work force requirements are determined by contract complexity and dollar size.

An interview with Mr David Jansen, the director for subassemblies procurement at corporate headquarters, gave additional insight into the HP procurement organization. To

find out how the organization really works he was asked: how buyer efficiency was measured, whether or not HP separates contract administration from award, and if any major corporate changes were ahead. In addition, he was asked to weigh the relative importance of: non-competitive follow-on awards to proven performers, long-term contracts and global sourcing of requirements.

Buyer efficiency within HP is measured between nine commodity buying groups using two separate metrics. The first is a traditional metric--worth 60% of the overall evaluation--and includes such items as judgment, quality, team-work, employee development, etc. The second metric places each commodity group in direct competition. Each commodity group tracks a predetermined index for their commodity (i.e. semiconductors, monitors, power supplies, plastic resins, interconnects, etc.). This index is then compared to their own negotiated purchase price for the commodity. HP sees the index as the price their competition is paying and expects to do better. Commodity groups are ranked annually by how much they beat the index. Based on this ranking group members are moved up or down on a five tier ranking structure for pay and promotion. This injection of competition among commodity groups is credited with improving HP's overall buyer performance.

HP handles the financial end of procurement at the corporate level and lets the divisions take care of the

physical side. Corporate puts the contracts in place, but it is up to the divisions to monitor performance and make buys against the corporate contract. This separation fits well with their highly decentralized corporate structure.

In the future HP sees an increase in corporate procured commodities. Mr. Gene Richter, the head of corporate procurement, formerly from Ford, believes strongly in centralized procurement. Accordingly, more commodities will be screened through the divisional levels to determine whether they can be centrally procured effectively. Test and measurement equipment is the next commodity under consideration.

Follow-on noncompetitive awards are used only if the price is right. Even in commodities like computer memory--HP has nine percent of the world market--quality has become so standard that awards are increasingly made on price alone. HP has 12 suppliers of computer memory, and feels that the number of suppliers is dependent on the number needed to supply the product. There is no conscientious effort to reduce the number of suppliers. In fact, many suppliers do not want total dependency on one customer and will not take business above a specified percentage.

Long-term contracts are used only when they benefit HP. If the commodity is experiencing a seller's market, then an effort will be made to close a favorable long-term contract. If the commodity is experiencing a buyers market

long-term contracts are avoided to ensure maximum advantage of competition and declining prices.

Global sourcing is the most critical element to HP's procurement success. Mr Jansen said that in computer memory Korea is "Saving our Bacon." He is actively pursuing suppliers in China as well and sees tremendous potential for both future suppliers and sales. (Jansen)

4. Intel

Intel's success story shows the dynamic nature of the high technology industry. Listed 10th in the chip making industry in 1987, by 1992, Intel surpassed both NEC and Motorola to become the number one chip maker in the world. (Raia, 1993, p. 73) With the introduction of Intel's 486 micro processor chip, sales in 1992 jumped 22% and profit was up over 30% topping $1 billion for the first time. A critical factor to their success has been placing purchasing on equal footing with design and manufacturing. The following initiatives, supplier monitoring processes, and organization are what makes the Intel procurement operation one of the best in the business.

a. Contract Management Initiatives

These initiatives won the Purchasing magazine Medal of Excellence Award for Intel. (Raia, 1993, pp. 70-71)

- Intel's supplier support program allows suppliers to use Intel equipment in Intel manufacturing plants to better learn the trade.

- Their unique approach to contract pricing has built in price increases when suppliers exceed predetermined goals in output and quality.
- Through consolidation Intel has reduced their supplier base and now relies on only 20 suppliers for over 80% of their contracting needs.
- Teamwork across functional lines and specialization by commodity allows faster turnaround times and more informed decisions.
- Development of a strategic purchasing plan which includes long-range sourcing strategies for all major commodities.
- Top management recognition of the procurement function as co-equal with design and manufacturing.
- Support of local business through nurturing programs aimed at reducing dependence on foreign sources.
- Paperless ordering. For example, their Albuquerque plant estimates that 95% of their supplier communications are paperless.

b. Supplier monitoring Process

Intel's approach to supplier monitoring is a combination of process validation and quality control through close association. Originally, contract performance was measured by defects per lot with upper and lower acceptability limits for defective parts. Realizing that this approach inherently accepts variations from the mean, they changed their policy to require perfect parts every time. This new goal embraces continuous process improvement and provides incentive for suppliers to improve. Intel is committed to long term relationships with key suppliers and prefers to validate their process, obviating the need for internal inspection. However, if a supplier is suspected of a process problem,

Intel demands a root cause analysis within 24 hours. (Raia, 1993, p. 81)

Intel's top supplier award is the Supplier Continuous Process Improvement Award. Like the Malcolm Baldrige Quality Award it is based on 1,000 possible points of which suppliers must score 700 or more to be eligible for the award. To date only one supplier, Sumitomo, one of three silicon suppliers, has achieved this award.

Mentioned earlier, Intel is committed to long term close working relationships with suppliers. In conjunction with this goal they have developed a strategy titled N+1. What this means is they want enough suppliers to provide the total quantity of a commodity and one extra to provide for growth and cushion against unexpected shortages.

A key problem with this plan is finding suppliers with the needed capabilities to provide this target base. To overcome this problem Intel has developed a supplier support program (SSP) to build up their supplier base. The plan allows suppliers to work with Intel equipment at Intel manufacturing plants until they have acquired the expertise to produce on their own. Through this close association, Intel evaluates suppliers based on--technical capability, quality and reliability, ability to expand services to other plants, total cost, and the desire to build and sustain a long term relationship.

Recognizing their dependence on Japanese producers for many raw materials--particularly plastic casings for semiconductor chips, photo steppers used to imprint circuit patterns on silicon wafers, and ceramic packages--Intel has used their SSP program to promote domestic suppliers. Last year, for the first time in eight years, 51% of their equipment needs were met within the United States.

c. Procurement Organization

Intel organizes its procurement shop by commodity and centralizes almost all of its procurement at their procurement headquarters in Chandler, Arizona. In addition to the procurement of key component materials, the Chandler operation handles advertising, plant construction, capital equipment, and transportation.

With the introduction of the new Pentium chip, up to five times faster than the 486 version, Intel sees a continuation of their rapid growth and an ever expanding procurement budget. Topping the $1 billion mark for the first time in 1987, the Vice President of procurement anticipates that expenditures will exceed $3.2 billion in 1993.

Mr. Sean Dowd, a purchasing manager for Intel's Corporate Marketing Group was interviewed to better understand the mechanics of their procurement organization. Questions asked included: how buyer efficiency was measured, what the overall satisfaction level of the buyers was, whether

or not Intel separates contract administration from award and if any major corporate changes were ahead. In addition, he was asked to weigh the relative importance of: non-competitive follow-on awards to proven performers, long-term contracts and global sourcing of requirements.

Buyer efficiency is measured through an annual development plan worked out between the buyer and immediate superior. This plan is tailored to the individual buyer and addresses areas for improvement, actions to be taken for improvement and how success will be measured in each area. For example, if negotiation skills is an area of deficiency the action taken may be attending a class in negotiation, success can then be measured either by class standing or an actual assessment of there skill in subsequent negotiation.

Satisfaction level of Intel procurement personnel is high. Mr. Dowd supported this position by sighting low turnover rates in personnel, increasing work opportunities and a general perception that the role of procurement is increasingly seen as of equal importance with engineering, manufacturing and marketing the more traditional functional areas within the corporation. In fact, he related that his purpose for being at the Santa Clara headquarters was to take over the management of contracting for advertising from the marketing department. This function had ballooned to over $200 million in business and was the only major corporate

level expenditure not already under the supervision of corporate procurement.

Intel like HP allows divisions to handle most contract administration functions. Corporate procurement relies on the divisions to inform them of quality problems and handle the physical inspecting and use of new products. This does not mean that corporate washes their hands of responsibility for quality products. The quality of goods received under the corporate umbrella is a direct reflection of the expertise of the commodity buyer. Accordingly, corporate purchasing managers are sensitive to divisional needs and always striving for continuous product improvement. A recent initiative in this area is a company wide supplier monitoring program which is still in the development stage. The ultimate goal is to allow input from all divisions concerned on a suppliers level of quality measured in terms of on-time delivery, flexibility of supplier to meet emergent demands, product defects, etc. This system would allow corporate purchasing managers real time access to supplier performance data when assessing follow-on contracts or incentive bonuses.

Other new procurement initiatives currently underway at Intel include small purchase order charge cards and supply-line management. The goal of the charge card system is to reduce paperwork by letting responsible representatives within the corporation to procure operating supplies on an as needed

basis without going through procurement. This concept offers greater flexibility to the line manager and empowers them to handle day to day purchasing needs. Supply-line management is a term Intel uses for contracting out an entire process to a single source of supply. For example, the chemicals and processing equipment used in "clean room" fabrication sites are now purchased from a single source where previously two suppliers were used. Now if a site does not meet the stringent cleanliness requirements for manufacturing semiconductors there is only one responsible party. Previously when contamination occurred equipment manufactures would blame the chemical manufacturers and the reverse.

Mr. Dowd believes that follow-on contracts with the same contractor are critical to Intel's success. He preferred not to use the word non-competitive and stressed these contracts were in fact very competitive; he dispelled the fear that this type of arrangement may lead to complacency by saying a contract is only as good as how it is managed. This philosophy on follow-on contracts held equally true for long-term contract arrangements with suppliers. All things equal Intel's preference is to buy American, but global competition demands global sourcing which is critical to Intel's overall success today.

B. DCMC DATA

For consistency, presentation of data on DCMC will be presented in the same general categories as private industry.

1. Contract Management Initiatives

The following is a list of initiatives which were extrapolated from interviews and literature review.

- The supplier monitoring function is centralized within DCMC. Previous NAVPRO, ARPRO, and AFPRO plant representatives were consolidated in 1990 to DPRO's.
- Heavy emphasis is placed on monitoring supplier processes with the introduction of In-Plant Quality Evaluation (IQUE) and process oriented contract administration services (PROCAS).
- The organization is making significant reductions in size which include reducing their U.S. districts from five to three.
- Upper management has reorganized into process action teams and focused more on customer needs.

2. Supplier Monitoring Processes

Supplier monitoring within DCMC is governed by the Federal Acquisition Regulation (FAR) and is highly dependent on the size of the supplier and the individual contract. The size of a supplier in terms of total contract dollars with the Government triggers various forms of monitoring functions which are carried out by the three major divisions within DCMC, and the Defense Contract Audit Agency (DCAA). These divisions include contract management, quality assurance, and program and technical support. To better understand this

process an overview of supplier monitoring requirements within each division is given below.

a. Contracts Management Division

The contracts management division has overall responsibility for all contract monitoring. Organizing required supplier monitoring--a complex task--is the responsibility of administrative contracting officers (ACOs). The ACO is a warranted contracting officer who has a specific number of suppliers assigned to his or her responsibility for an entire range of administrative functions. Monitoring is only one part of sixty six administration functions outlined for ACOs in FAR part 42.302(a). A common approach to this task is the preparation of concise lists of oversight requirements for each company under an ACO's purview. Table 4-1 is a current example of such a list for a major electronics company. This list is a duplication of one provided by an ACO working at Defense Contract Management Area Office, San Francisco. Specific FAR references and Defense Federal Acquisition Regulation Supplement (DFARS) references were added to show the regulatory basis for each monitoring activity.

The key points of interest in this list include: the range of responsible parties conducting oversight studies (shown in parenthesis under the system reviewed), the number of studies required, and the FAR mandate. The FAR does

allow some room for interpretation in the area of follow-on supplier monitoring and the need for additional oversight. However, the fear of regulatory oversight compels most ACOs to interpret FAR requirements in their strictest sense.

TABLE 4-1 SYSTEM REVIEWS REQUIRED BY FAR

NR	System Review	Status	Interval	Ref
1	Purchasing Systems Review (CPSR) (DCMDW)	DCMO South Bay Approved	Every Three Years	FAR 44.302
2	Insurance/Pension (DCMD Contractor Ins Br.)	To be Scheduled by CACO	Biennial	FAR 28
3	Government Property Control Survey (DCMAO-SF Prop Mgmt Br.)	DCMO South Bay	As Required	FAR 45.511
4	Quality Assurance (DCMAO-SF/GFBQ)	Adequate	As Required	FAR 46
5	Accounting Systems (DCAA ATD Suboffice)	Adequate (Cont Review)	Continuous	FAR 16.104
6	Estimating System (DCAA ATD Suboffice)	Approved	Every Three Years	FAR 15.811
7	Employee Compensation (DCAA ATD Suboffice)	DCMO South Bay ACO Approved	Initial Award & As Required	FAR 31.205
8	Material Mgmt & Acctg Systems (MMAS aka MRP)	DCMO South Bay ACO Approved (Under Review)	Initial Award & As Required	DFARS 242.704
9	Master Subcontract Plan (DCMAO-SF Small Bus.)	MOA by ACO	Annual	FAR 44.304

Note 1: Requirements number (1, 2. 7, and 9) are for companies with anticipated annual Government sales over $10 million.

Note 2: Requirement (3) gives the ACO authority to audit control systems for Government furnished property--if provided on contract--on an as required basis.

Note 3: For requirement (4), the Government relies on the contractor to perform quality inspection and testing. However, DCMC Quality Assurance Representatives periodically validate these procedures and handle unique quality specifications as required by contract.

Note 4: Requirement (5) is designed for contracts which are cost-type, fixed-price redeterminable, or fixed price with progress payments.

Note 5: An estimating system and MMAS review, requirements number (6 and 8), are required for contractors with greater than $50 million in DoD business the preceding year.

Because of the ACO's unique position as the overall coordinator for all administration functions, they are often the lightning rod for new DCMC initiatives. Process Oriented Contract Administrative Services (PROCAS) is the most recent initiative embraced by DCMC headquarters.

Through the steps outlined in Figure 4-2, PROCAS tries to form a partnership with suppliers. (Stacy-Nichols, p. 9) It is interesting to note how this system closely parallels private industry supplier assistance programs like; Ford's supplier quality improvement program, Motorola's University and Intel's supplier support program. Both PROCAS and private industry initiatives stress early supplier involvement and offer assistance to suppliers in understanding how their internal processes can be improved.

DCMC representatives are now a part of a firm's day to day operations planning team. Previously, there was little emphasis placed on assisting suppliers in the improvement of their processes. This new approach has received high praise in some business circles.

1. Government planning
2. Teaming agreement
3. Team planning
4. Process selection
5. Understanding the process
6. Select appropriate metrics
7. Measure, analyze, manage
8. Adjust management

Figure 4-2 PROCAS Steps

In a recent article, the American Society for Quality Control outlined the PROCAS process as it has been applied at General Electric, and had this to say about results:

> In addition to improving speed and quality, the PROCAS approach provides a way to target limited resources where they will do the most good. Both GE and DCMC want to make sure that top-quality engines are produced on time, to the customer's specifications.... (ASQC, p. 6)

While PROCAS has many positive points, discussion with ACOs responsible for implementation pointed out two negative aspects. First, it does not reduce oversight but rather streamlines supplier systems to better produce oversight requirements. Secondly, the program requires additional manning; consequently, only select firms are participating in the program. Not surprisingly, these firms are the Government's largest suppliers, already familiar with the monitoring system. As a result, many smaller suppliers who are unfamiliar with the process and would benefit greatly are left out of the PROCAS program.

It is important to note that this program is not singular to the contracts management division. It is presented here because it requires overall coordination between DCMC branches, a function which normally falls to the ACO.

(1) Quality Assurance Division

The quality assurance division has recently seen some significant changes. In May 1990, DLA

implemented In-Plant Quality Evaluation (IQUE) as a new system to take the place of the Contractor Quality Assurance Program (CQAP). The new IQUE system, outlined in DLAM 8200.5, is aimed at replacing the rigid strict conformance to specification requirements of the previous system with a process and customer-oriented approach. Mandatory end item inspections are replaced with process or product audits. New tools such as, statistical process control, Pareto analysis, flow charting and control charts are emphasized where they were not previously.

The IQUE approach focuses on: guidelines vice rigid rules, less control of practices vice tightly controlled rules, establishing a range of quality tools vice specific rules, and encouraging flexibility vice contractual remedies. Accordingly, the role of the quality assurance representative (QAR) has changed from that of a policeman to more of a coach. This new change has been dramatic for many QARs, and has required a great deal of training to change the existing culture. (Alstott, pp. 6-10)

In addition to IQUE, many QAR's are called on by the DoD customers they serve to provide specific types of quality audits. The branch head of the quality department at DCMAO San Francisco related that his work is driven by specific test and inspection criteria designed by NASA, his primary customer. Because of the high risk nature of the

aerospace industry, his inspection requirements usually include a 100% review of the end items.

(2) Program and Technical Support Division

The program and technical support division, made up of engineers and industrial specialists, looks at specific contract requirements and assesses a suppliers ability to conform with performance, cost, and schedule requirements.

For major weapons systems contracts (R&D expenditures over $200 million or total expenditures over $1 billion in 1980 constant dollars) which make up the bulk of Government procurement dollars; cost, schedule, and performance ability are the key components to monitor. To understand how this division works, Figure 4-3 shows a current list of functions generated by an Engineering Process Action Team at DCMAO San Francisco. (Gines)

For each item listed in this figure there is a flow chart and instructions for implementation. Discussion of all of these procedures is beyond the scope of this paper; however, to gain insight into the actual

- Work Measurement
- Reliability & Maintainability
- ./SCSC Surveillance
- Integrated Logistic Support
- Should Cost
- Software Process Surveillance
- Test Management
- Technical Support to Negotiation
- Tech Data
- System Safety Surveillance
- Value Eng Change Proposals

Figure 4-3 Planning & Technical Support Functions

procedures an overview of the reliability and maintainability program, and C/SCSC are given below. These two programs were selected as they are generic to most major contracts and are representative of other program structures.

The key to the reliability and maintainability program is the reliability plan generated by the supplier in response to a Government request for proposal. This reliability plan outlines the internal control procedures which the supplier has in place to monitor the quality of its product for compliance with contract specifications, and is usually approved prior to contract award. Government engineers then audit the company for compliance with their own plan. Figure 4-4 is a flow diagram of how this audit function is done at DCMAO San Francisco.

The diagram shows that if an approved control plan is not in place at contract award, DCMC is deeply involved with the contractor to set up such a plan. Additionally, DCMC is constantly monitoring the supplier for compliance. The next section describes C/SCSC, a required part of every major weapon system acquisition designed to closely monitor cost and schedule performance.

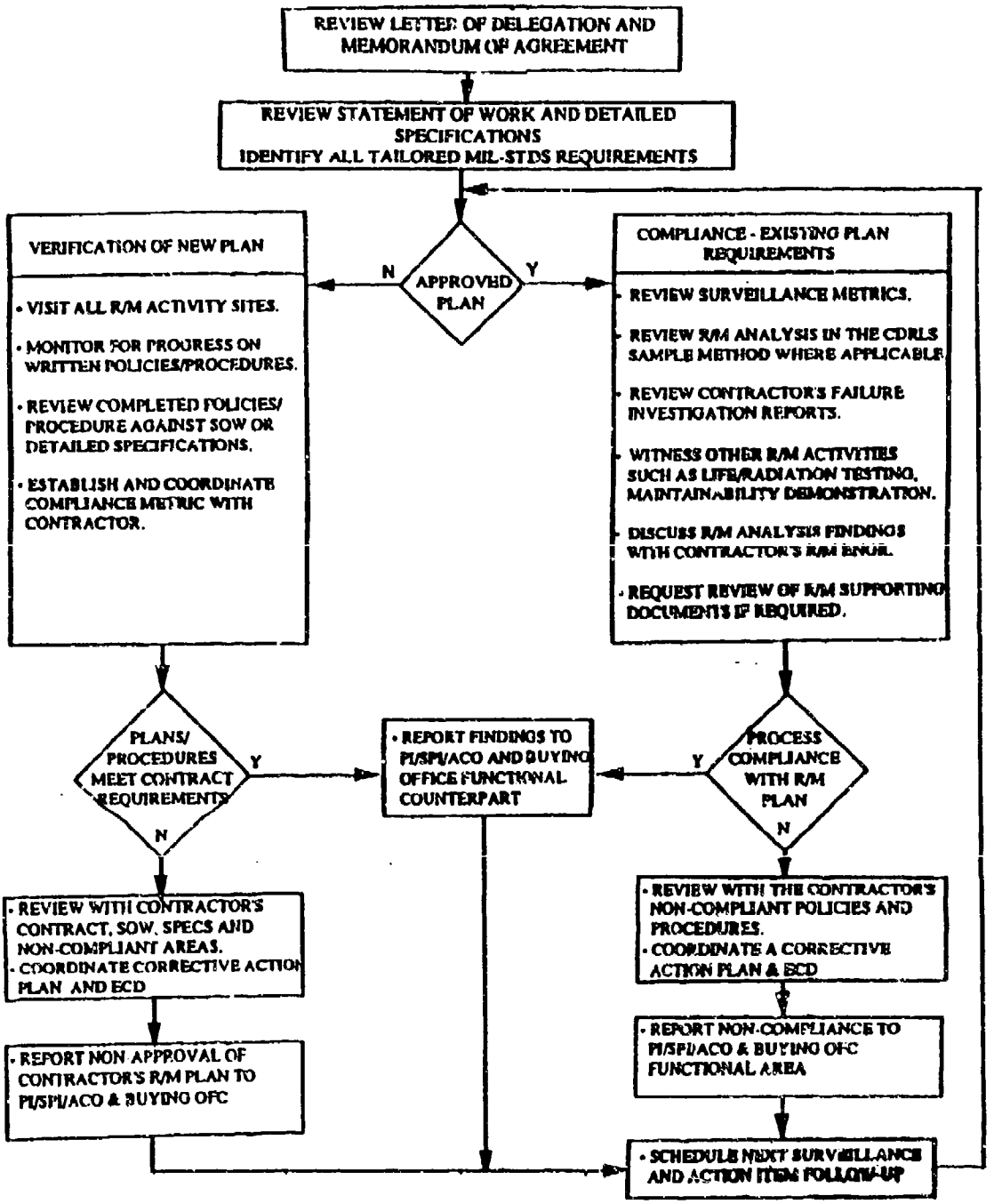


Figure 4-4 Reliability/Maintainability (R/M) Surveillance

Cost/Schedule Control Systems Criteria (C/SCSC), designed for major weapon systems acquisition, is the primary tool used to monitor supplier cost and schedule performance. In essence, this system looks at cost and schedule performance by converting all contractor activities into a dollar value and using that dollar value as a yardstick against actual performance.

To better understand this process, one must first discuss the work breakdown structure required for every major weapon system acquisition. This structure breaks the construction of a new system down into its lowest component parts, work packages. Each work package is a detailed instruction on how to perform some task which when combined with other work packages make up the entire system. Further, work packages give a detailed accounting of the estimated labor and material cost to complete the entire program.

These work packages then become the link between the work breakdown structure and the C/SCSC process. Once they are established, DCMC audits a specific number of packages for completion and compares the actual cost reported by the contractor against the scheduled cost to estimate whether the complete project will be over or under budget. Additionally, the budgeted cost of work performed is compared with the budgeted cost of work scheduled, for a given point in time, to determine if the program is on schedule.

Contractors have their internal C/SCSC estimating system reviewed for compliance upon contact award. The review covers the areas of: organization of work, planning and budgeting, accounting, revisions and access data, and analysis of variances. Within these broad categories there are 35 specific criteria which are used to gauge the effectiveness of the supplier's data generating system.

The accuracy of the contractor's internal reporting system is crucial. The data retrieved from this system is then used in the following reports; Contract Funds Status Report, Cost Performance Report, Cost/Schedule Status report, and Contractor Cost Data Reporting. These reports provide updates to the program sponsors which include; the major systems command, DoD, and Congress.

3. DCMC Organization

DCMC is a branch of the Defense Logistics Agency and is organized by geographical districts. Within each district, depending on the number and size of contracts, suppliers are monitored by either a defense contract management area office, or a defense plant representative office. Appendix B shows how DCMC is organized under DLA, Appendix C shows the current district organization of DCMC, and Appendix D shows the organization within DCMAO San Francisco.

Mentioned earlier, a Base Realignment and Closure Recommendation was made to realign the districts from five to

three and efforts to do so are ongoing. This will expand the areas covered by the remaining districts and result in increased workloads for ACOs.

Currently ACOs receive work assignments based on zip codes. While allowances are made for the size and dollar value of companies, new business within a specific zip code already has an ACO assigned. One ACO at DCMAO San Francisco, was responsible for 300 contractors with $3.2 billion total value.

In connection with work assignment, funding passed from the district to the DCMAO is based on workload in terms of the number of contracts and dollar value. However, conversation with personnel at the San Francisco area office suggested that the budget was primarily static and related that budget cuts between districts are mandated on an across-the-board percentage basis suggesting that workload is not a predominant budget criteria.

C. SUMMARY

Chapter IV presented contract management initiatives, supplier monitoring processes, and the organization structure of contract monitoring activities both within private industry and DCMC. Chapter V will analyze key industry initiatives and identify commonalities between "best practice" firms. These common initiatives will then be compared and contrasted with DCMC procedures. This is analogous to step three in the

benchmarking process model, presented on page 11, which requires determination of performance gaps between the company conducting the study and the "best practice" firm being studied. Additionally, explanations for differences between private industry and Government will be presented which will support recommendations in chapter VI for improving the process.

V. ANALYSIS OF "BEST PRACTICE" INITIATIVES

This chapter will look at initiatives which are common to the "best practice" firms identified by this study, and then compare and contrast these initiatives with current DCMC processes. The goal is to discover gaps between approaches which can be eliminated through adoption of private industry practice. This analysis parallels steps three and four in the benchmark process which looks first at determining gaps or differences and then analyzes the possible causes.

A. COMMON "BEST PRACTICE" INITIATIVES

The initiatives listed below are common to all "best practice" firms. Each is deemed critical to the success of the procurement operation and contract monitoring procedures of the firms studied.

1. Early Supplier Involvement

Companies are looking for innovative ideas and assistance from suppliers to reduce cycle times and improve product quality. Early supplier involvement, enhanced by a reduced supplier base and long-term supplier relationships, allows buyer and seller to work as a team capitalizing on the best skills of each organization to promote new products.

2. Centralized Procurement of Key Products

The spectrum of centralization ranged from Ford at the high end, where 80% of spare parts are purchased centrally (through their North American Automotive purchasing group), to Hewlett-Packard at the low end where only 10% of line items are procured centrally. Interestingly, the 10% of line items procured centrally accounted for 50% of Hewlett-Packard's annual outlay. (Raia, 1992, p. 37) The commonality here is that all "best practice" firms aggressively took advantage of quantity buying power even if they were highly decer ized.

3. Supplier Monitoring & Recognition

All of the top private industry firms had a unique program for monitoring and recognizing supplier performance. Programs which emphasized quality in terms of technology, number of defects, level of technology, etc. over cost. These programs served as a performance measuring stick and a tool to weed out noncompetitive suppliers, another common initiative.

4. Reduced Supplier Base

With the exception of Hewlett-Packard, every "best practice" firm made significant reductions in the number of their suppliers over the past several years. From 1980 to 1990, Ford trimmed its supplier base by 40%. (Raia, 1990, p. 42) The prevailing thought was a reduced supplier base enhanced visibility and offered advantages through better service and closer working relationships.

Quality programs were critical in achieving supplier reductions. In every case, supplier down sizing decisions were made based on the suppliers quality rating.

5. Global Sourcing

In each company there is increased procurement from foreign countries. Of $50 billion in annual procurement, Ford spent $15 billion in foreign procurement in 1990. (Raia, 1990, p. 49) Intel and Motorola are totally dependent on foreign sources for certain key components in their computer chip manufacturing. In fact, they are so concerned about the domestic supplier base that they have each established initiatives to improve the base: Motorola through its university for training quality, and Intel with its supplier support program. They both feel that the lack of quality domestic suppliers leaves them overly exposed in the event foreign suppliers opt to restrict their exports.

6. Long Term Contractor Relationships

In conjunction with reducing their supplier base and early supplier involvement, "best practice" companies are establishing longer term relations with remaining suppliers. Along with these longer term relations is the demand for constant improvement. Many of Ford's long term contracts include clauses which reduce prices each year of the contract life based on anticipated improvements in productivity.

B. COMPARISONS WITH DCMC ORGANIZATION

Of the six key trends identified, early supplier involvement, centralized procurement, and to a lesser degree supplier monitoring & recognition are evident in both DCMC and private industry. A closer look at these parallels is seen below.

1. Early Supplier Involvement

Realizing the importance of working with suppliers, DCMC's most recent initiatives--IQUE and PROCAS--rely on heavy involvement with a supplier's process. These programs give all divisions within DCMC greater awareness of a supplier's process and valuable points of contact within the supplier organization. This critical element in the contractor-supplier relationship allows quicker and more thought out changes with input from both the end user and manufacturer. Additionally, new contract awards are now closely integrated with the supplier as a result of an improved knowledge of his internal processes.

2. Centralized Procurement

DoD has long been a proponent of centralized procurement. Through its Defense Logistic Agency inventory control points, all DoD spare part requirements are procured centrally.

This concept is not limited to spare parts; increased emphasis is also being placed on the interoperability of

weapons systems between services through centrally procured system components. The Under Secretary of Defense for Acquisition and Technology, Dr. John Deutch, underscored this goal by outlining a plan to rely on a common pool of equipment, from expensive radars and navigational systems to ground-based simulators, for both Navy and Air Force aviation requirements. (Pastor, p. A12)

Like private industry, the goal of this initiative is two-fold; first, to reduce cost through interoperability and spare part support; second, to recognize economies of scale by pooling asset requirements.

Centralized procurement impacts DCMC by reducing the number of suppliers to monitor. This reduces administrative cost and gives DCMC larger contracts on which they can focus greater resources.

One of the advantages of centralized procurement in the private sector not realized by DCMC is the advantage of coupling large centralized buys with long term supplier relationships. This concept is discussed in greater detail in Section C.3, but is mentioned here as there is a natural connection between centralized procurement and long term supplier relationships.

3. Supplier Monitoring & Recognition

Through PROCAS and IQUE, DCMC has two excellent vehicles for monitoring contractor performance. Like private

industry, DCMC is actively working with contractors to improve their internal quality control processes. This teaming approach increases contractor efficiency and improves the end product. William Waldmen, a senior TRW official identified 37 specific improvements since adopting PROCAS including a 50% decrease in cycle time for Government forward pricing rate agreements and a 49% decrease in rejections. (Stacy-Nichols p. 8)

Unfortunately, unlike private industry these DCMC initiatives fall well short of their full potential. A discussion of areas where this system needs improvement is given in Section C.5.

C. GAPS BETWEEN DCMC AND PRIVATE INDUSTRY

DCMC initiatives which are not common or do not closely parallel private industry include: reduced supplier base, global sourcing, long term contractor relationships, formal organization which includes both a contract award and administration function, and to some extent, supplier monitoring and recognition. Each of these differences is discussed further below.

1. Reduced Supplier Base

As a result of the statutory limitations imposed by the Competition in Contracting Act (CICA) and the emphasis placed on competition throughout every phase of major system acquisition, the Government has historically been extremely

competition-oriented and aggressively expanded their supplier base. This is in direct contrast with private industry which has actively decreased their number of suppliers in the past decade.

Recently this dichotomy in approaches has come under a great deal of scrutiny. Fueled by reduced DoD spending and President Clinton's "Bottoms-Up Review" carried out by the Secretary of Defense, Les Aspin, the Government is becoming increasingly active in assisting suppliers to convert their facilities for commercial use and allowing reductions in the number of Government suppliers. Mergers previously considered by the Federal Trade Commission as antitrust violations, like Alliant Techsystems and Olin Corp, are now being reconsidered. Both firms are in the ordinance business, which due to a decline in Army missile procurement, attempted a merger in 1992 which was aggressively opposed by the Federal Trade Commission. (Ricks, p. A16)

While this renewed Government interest appears to be a step in the right direction, there is no sign of eliminating the CICA mandate for fair and open competition on all new procurement.

2. Global Sourcing

Buying U.S. made products has been a fundamental concept of Government acquisition from its inception. The Government has used Federal acquisition as an instrument of

its fiscal policy in every major depression and recession. Currently, the Government still sees the creation of jobs through federal spending as a primary vehicle for reducing unemployment.

Legislation like the Buy American Act (BAA) inhibits DoD from aggressive global sourcing. The inability to procure globally protects segments of the defense industry base from global competition. This forces both the PCO and ACO to deal with contractors who may be inferior to foreign competitors both in quality and price.

3. Long-Term Contractor Relationships

Long-term relationships which are key to improved supplier relations in industry require federal approval within DoD and are seldom used. While shorter contracts may be more flexible in an environment of constant change, the benefits of longer term relationships cannot be overemphasized. A long term relationship not only fosters a partnership between buyer and supplier, but it allows contractors a greater degree of planning in terms of facilities, capital requirements, and work force.

Additionally, frequently changing companies forces a completely new set of monitoring requirements on DCMC which then must start from ground level and workup to understand the new companies' procedures. (Kennedy) While there are certainly cases which require a supplier change, the cost of

doing so is recognized within private industry, but often ignored in the DoD sector.

The politics of maintaining close Congressional control is most frequently cited as the impediment to enacting multi-year contracts. The power of the purse, undoubtedly Congress' strongest source of power, would be diminished if DoD were given authority to commit funds on a multi-year basis. Accordingly, Congress has micromanaged spending within DoD through the House and Senate Armed Services Committees and Appropriations Committees.

4. Organization Structure

Private industry evaluates contracts with feedback directly from the end user, the companies production line. Systems like Hewlett Packard's PROMIS system (Chapter II 3.b) are designed to handle contracts from cradle to grave with direct input access from all concerned parties. This contrasts with DoD's structure where contract award is performed within a Service-specific organization (e.g. Air Force, Army, Navy, Marines) and monitoring is done by DCMC a DoD wide organization, not an end user.

This separation of the PCO and ACO functions can lead to inefficiency. For example, an ACO at DCMAO San Francisco recalls conducting a pre-award survey (a thorough assessment of a company's financial viability prior to contract award), on a contractor which had a long history of successful

Government performance because a new PCO was unaware of its past performance. He added that there is no common database between organizations which tracks supplier performance. (Pfeiffer) This lack of a common database between organizations ensures, at a minimum, duplication of effort when contract information is entered from one database to another. This is compounded by the fact that DCMC services all procurement branches of DoD: each have their own unique automated procurement systems.

Communication between PCOs and ACOs has been a topic of some debate. A study of this topic in the arena of major weapons system acquisition recommended:

> PCOs and ACOs assigned to weapon system contracts continue to strive for more effective and more complete communication in order to eliminate voids and minimize duplication of effort in performing contract administration. (Wanner p. 44)

Because the unique separation between PCO and ACO functions, under the current DoD organization, does not closely parallel private industry, it is presented here as a possible area for change.

5. Supplier Monitoring and Recognition

Discussed here are reasons why supplier monitoring and recognition within DCMC fails to meet its full potential. Reasons for this failure include the following: (1) failure to reward superior performers, (2) no centralized database for

supplier monitoring (3) excessive oversight requirements. Each of these areas are discussed further below.

a. Failure to Reward Suppliers

The best reward a superior supplier can hope for within the Government system is improved profit on an existing contract. Even that may not be possible depending on the contract type. Private industry offers tangible incentives in the form of long term and incentive-based contracts. Ford estimated that over 70% of its suppliers are under long term contracts. (Raia, 1990, p. 42) Intel said of incentive-based contracts: "the concept has inspired our U.S. suppliers." (Raia, 1993, p. 73)

Of these two contract types, long term contracts is the most tangible as it offers a base on which companies can plan for future workload and long term viability. Government contractors do use incentive contracts, but regulation requires Congressional approval of contracts which obligate money longer than one fiscal year. (DoD 5000.2M p. 21-1)

b. Inadequate Feedback

Because the procurement contracting officer (PCO) and the ACO work for different commands there is often a costly disconnect. Mentioned earlier there is no central database which documents supplier quality within DCMC. As a result, the best data available on a suppliers past performance is a periodically updated and distributed list of

suspended or debarred contractors. This is significantly different from private industry where the procurement contracting officer has either a centralized database for supplier performance or holds periodic performance reviews on each supplier with the product end user.

c. Excessive Oversight

The list of oversight requirements for Government contracts is endless. To gauge the scope of the problem look at the agencies authorized to perform oversight; DCMC, PCO and staff, program/project manager, Defense Contract Audit Agency (DCAA), Office of Federal Contract Compliance Programs, Agency Inspector General (including; Defense Criminal Investigate Service, Navy Investigative Service, U.S. Army Criminal Investigation Division, and Air Force Office of Special Investigations), General Accounting Office, and various Congressional committees and staff. (Sherman p. 71)

With this number of auditing bodies, there is little wonder why many businesses shy away from Government contracts. The bureaucracy inherent in this type of oversight is staggering. Recently the Under Secretary of Defense, Dr. William Perry, addressing Naval Postgraduate School at a guest lecture, stated that 30% of every Government procurement dollar goes to administration vice 10% in private industry. This thought was echoed by ACOs at DCMAO San Francisco, who were quick to point out that many of the monitoring reports

which they receive are done to satisfy FAR mandates and have little value added.

D. SUMMARY

Chapter V identified six common initiatives in contract monitoring within private industry; early supplier involvement, centralized procurement, supplier monitoring and recognition, reduced supplier base, global sourcing, and long term supplier relationships. Of these initiatives the first three were apparent within DCMC to varying degrees, but the last three were not. Based on the analysis of these differences, Chapter VI will draw some conclusions, make recommendations to improve the DCMC organization, give summary answers to the initial research questions and list areas for further research.

VI. CONCLUSIONS AND RECOMMENDATIONS

The final step in the benchmark process, this last chapter will draw conclusions on why differences exist between private industry and Government contract monitoring and make recommendations on improving DCMC's contract monitoring procedure. Additionally, a section will be devoted to summarizing answers to each of the research questions presented in Chapter I and identifying areas for follow-on research.

A. CONCLUSIONS

Two conclusions drawn from this research which must be addressed are: (1) private industry has no organizations equivalent to DCMC, and (2) Government contract monitoring will never closely parallel private industry without a change in goals.

1. DCMC Has no Private Industry Equivalent

Private industry has no organization like DCMC which is solely responsible for the administration of contracts. Consequently, many of the comparisons made with private industry, and recommendations for improvement, go beyond the scope of just contract monitoring.

This difference in organization is a central issue to this research and became a vocal point for discussion. The

pros and cons of separating contract award and administration were discussed with several contracting professionals both within private industry and Government.

Procurement mangers from both Intel and Hewlett Packard felt that some separation was needed between the business end of awarding corporate contracts and their administration. They based their opinion on the difference in skills required to award a contract and take care of the physical receipt and material management of the product. Negotiation skills and business acumen are key to contract award, but statistical sampling and material management experience are more critical to administration. At Motorola, group procurement managers actually take part in corporate contract awards. Consequently, they maintain control of both contract award and administration. (Burleson)

On the Government side the separation of contract award and administration is more complicated. Because DCMC is not the end user of the product, like private industry groups, the contract administrator (DCMC) is accountable to the procuring organization who in turn works for the end user. This separation from end users can cause mistakes. The Director of Contract Management for the Naval Sea Systems Command stated that he has seen several examples where parts from contracts administered by DCMC simply do not work in the fleet. (Hickman)

To parallel private industry, DCMC would need to combine with the Service procurement organizations and allow the end users to perform the physical side of contract administration. Taken alone, this step would put contract administration back to where it was before the 1963 Project 60 study; the study which led to the merger of Army, Air Force, and Navy contract administration organizations and gave birth to the current DCMC organization.

An alternative to this approach, would be the merger of DCMC with a new DoD-wide procurement organization responsible for all Army, Air Force, and Navy procurement. The resulting organization would encompass the entire contracting process from award through administration and close-out.

At least in part this type of organization has been proposed before. Harold Brown and James Schlesinger, both former Secretaries of Defense, made a similar recommendation to the New York Times in 1988, saying:

> We should also consider integrating the acquisition system, creating a single organization staffed by civilians and military officers from each service. A radical change like this, however, should be developed, evaluated and--assuming it holds up to scrutiny--implemented by the Defense Department itself. The imposition of such an organization through legislation would guarantee failure. (Dobler, Burt, Lee, p. 705)

The profound nature of this recommendation prompted some additional inquiry into its feasibility.

The Director of Contract Management for the Naval Sea Systems Command said that such an organization was possible,

but added that an assessment of its merit would be extremely difficult. (Hickman) The Deputy Director for Contracts at Fleet Industrial Service Center (FISC) Oakland said he was surprised that there were no existing initiatives to centralize contracting across Service lines. He added that regional consolidation of large contracts was ongoing within the Navy in response to base closures and down sizing. At FISC Oakland, the current plan is to withdraw large contract authority and refer any large contract requirements to the Naval Regional Contracting Center in San Diego. On the issue of combining procuring and administration functions, he felt separation was necessary and stated that the emphasis placed on contract award among Procuring Contract Officers causes administration to fall through the cracks if not handled separately. (Copas)

The Head of Contracting for Public Works Center (PWC) Oakland felt that the degree of specialized knowledge required for different types of contracting made consolidation across service lines infeasible. He added that the $65 million in large contracts for which PWC was responsible were managed from cradle to grave in house. Repair and overhaul, ground maintenance, and hazardous waste disposal made up the bulk of the PWC workload and required specialized knowledge to award and administer. Further, he felt that DCMC's role was geared towards administration of supply parts type contracts and not

particularly suited for major weapon systems or construction type contracts. (Haitz)

Posing the idea of a single DoD organization to the Program Manager for Customer Outreach at DCMC, he pointed out that such a proposal had been discussed before, but felt it was unwarranted. He added that since the transition from DCAS to DCMC in 1990 the organization has been increasingly in demand by PCOs. Further, with the advent of fee for service he felt certain the role of DCMC would expand outside the boundary of DoD and perform contract administration for other Government agencies. He noted that such an expansion would compound the difficulty of creating a single DoD contracting organization. (Toda)

Summarizing these various views it is clear that a great deal of ambivalence exists towards a combined DoD procurement organization. The concept of such an organization is addressed here only because the current DCMC structure is not present in the best of private industry. Consequently, revising the existing structure is an area which merits further consideration, but is beyond the scope of this research.

2. Public VS. Private Industry Contracting Goals

One contract professional stated that two thirds of the purpose for Government contract administration is to ensure compliance with congressional socio-economic programs.

(Hickman) These programs like small business set-asides, set-asides for minority and disadvantaged businesses, promotion of Federal Prison Industries, conformance with fair labor laws, and promotion of environmentally sound products hampers the systems ability to match private industry efficiency. (Sherman pp. 346-353) In contrast, the primary goal of private industry is best value in terms of quality, delivery schedule, technology, and price.

This fundamental difference in goals between Government and private industry makes comparisons difficult. The issue of changing goals and corresponding legislation is unavoidable if Government contract monitoring will ever truly parallel private industry.

B. RECOMMENDATIONS

Prior to presentation of recommendations, it is important to note that the area of Government acquisition reform has received a great deal of scrutiny with limited success in effecting reforms. A 1988 Congressional report subsequent to the Packard Commission findings noted that it was the sixth major study of defense acquisition in the past four decades, recognizing the fact that it was merely addressing continuing problems. The forward of the report quoted the current House Armed Service Committee Chairman (Les Aspin) saying: "Perhaps the next executive commission should be created, not to

propose the reforms, but to implement them." (U.S. Congress, 1988)

A common thread throughout previous commission reports and the most recent Section 800 Panel and National Performance Review (promulgated in 1993) was the need to reduce Government oversight and allow managers greater flexibility to act more like private industry. A quote from this year's National Performance Review highlighted this need by saying we need to "...change federal-procurement from 'rigid' rules to 'guiding principles' that allow Government managers more freedom....". (Birnbaum p. A1)

Accordingly, the recommendations listed below call for changes in existing policy which cannot occur without corresponding changes in Government goals and legislation. Recommendations include: (1) reducing DoD's supplier base through monitoring and rewarding, (2) removing the restriction on long term supplier relationships, (3) promoting global sourcing of requirements, and (4) refocusing DoD procurement on customer quality.

1. Supplier Base Reduction by Monitoring and Rewarding

Just like private industry, DCMC must act as the catalyst for reducing suppliers and rewarding superior defense contractors. PROCAS and IQUE are initial steps in a broader program which must recognize superior suppliers through the non-competitive award of follow-on contracts. This procedure

will seriously reduce contract award costs and the number of defense contractors.

The 1993 National Performance Review recognized the advantage of rewarding suppliers and recommended establishment of an interagency Excellence in Vendor Performance Council to:

> Establish policies and techniques to measure contractor performance under contracts and use this information in source selection. (Federal Contracts Report, 1993)

This type of arrangement, common in private industry, is illegal under current law. The Competition in Contracting Act (CICA), Public law 98-369, mandates competitive contract award with only limited exceptions.

In addition to prohibiting the reward of superior performers, this mandate negatively impacts early supplier involvement and long term relationships. Companies who cannot be guaranteed follow-on work are hesitant to invest in early research and design of new products.

2. Long Term Supplier Relationships

Title 10 U.S.C. 2306, which mandates contract types, must be changed to allow multiple year contract awards. This recommendation ties closely to reducing the number of Government suppliers. Entering into longer term contractor relations is a atural vehicle for reducing the number of suppliers and awarding superior performance.

The time is ripe for change. A proposal from this year's National Performance Review called for implementation of a two year budget. Hopefully, this initiative is a first step in broader changes which will free the contracting officer to award long term contracts.

3. **Global Sourcing**

Government has never embraced global sourcing of DoD acquisitions. However, with the significant initiatives to reduce tariffs and increase trade, like GATT and NAFTA, the Buy American Act needs revision to allow all non-critical items to be procured globally. This will open competition to new areas of Government acquisition and presumably have the same effect on quality as Japanese competition has had on the Big Three auto makers.

4. **Refocusing on Customer Quality**

Government procurement personnel have been inundated with mandated requirements for so long they are unable to provide the kind of quality customers expect. In procurement, quality is getting the right material, in the right quantity, at the right time, from the right supplier, at the right price to meet the customer's need. The current environment places so much emphasis on oversight that contracting professionals are unable to meet all of the quality requirements.

By reducing mandatory regulations the contracting officer can regain the flexibility needed to meet the

customers needs. Surprisingly, a study done by the Merit Protection Standards Board on the quality of the contracting work force (specifically GS-1102s) and the quality of the procurement process, found in general that the work force was doing a good job. However, the procurement process was resoundingly criticized in this same study as inefficient and failing to serve the best interest of either the Government or Private Industry. (Crum, pp. 161-163)

5. Summary

The Government supplier monitoring process will never be a mirror image of its private industry counterparts unless the underlying goals are changed. National objectives, security needs, funding limitations and lack of profit as a motivator are a few of the reasons for this dichotomy. However, the general feeling that the Government is inefficient and the continued deficit in resources demands that every attempt must be made to adopt industry initiatives where savings can be made.

Consequently, the recommendations of this research are aimed at improving the contract monitoring process in the broadest sense by freeing contracting personnel from regulations which prohibit their efficiency.

C. SUMMARY ANSWERS TO RESEARCH QUESTIONS

Summarized below are answers to the questions posed at the start of this research. Additionally, the final section of this report outlines areas of interest for follow-on research.

1. What "best practice" industry initiatives in monitoring large contract suppliers can be applied to Government contract administration?

Industry initiatives applicable to Government acquisition include: (1) reduced DoD supplier base through monitoring and rewarding quality firms, (2) use of long term supplier relationships, (3) global sourcing of suppliers, (4) radical reduction in oversight and (5) focus on customer and product quality vice procurement process.

2. What criteria are used to monitor supplier performance in private industry?

Each private industry firm presented had unique monitoring criteria. However, the overall trend was a focus on "best value" described as the lowest number of defects in parts received, responsiveness, technical innovation, just-in-time delivery, etc.

3. How often does private industry review suppliers for contract conformance based on their criteria?

The goal of all firms was to reduce the level of supplier monitoring as much as possible. However, quality assessments were done periodically to rate overall supplier effectiveness. For example, Hewlett Packard related that it

reviews supplier performance through Procurement Strategy Boards which meet two to four times annually. (Survey data)

4. **What factors are used to determine the manning level and organization for contract monitoring in private industry?**

Manning levels were determined by cost and complexity of the contracts managed. There was no specific metric found for this calculation and procurement organizations were treated as discretionary cost centers for budgeting purposes.

D. RECOMMENDATIONS FOR FURTHER RESEARCH

The areas listed below were identified for further research.

- Review the feasibility of merging acquisition agencies across service boundaries. This research would identify various offices, develop criteria for the merger, express how the new organization would look, and address the barriers to achieving such a goal.

- Assess the compatibility of the different databases used within DoD to both procure and administer contracts. This study would outline each system, discuss compatibility between systems, identify the amount of data currently transferred between the procuring and administering systems, and assess the best system for use throughout DoD.

- Explore reengineering the internal relationship between the major divisions within DCMC; contract management, quality assurance and program and technical support. This study would look at radical new ways of internal design within the existing organization to dramatically improve their internal processes. The study would apply reengineering concepts outlined in Reengineering the Corporation, a reference book used in this research.

APPENDIX A

SUPPLIER MANAGEMENT SURVEY

Demographics

1. How many active contracts does your company have which equal or exceed $25,000 in total dollar value?

_____

2. What is the total dollar value of these contracts?

_____

3. How many different suppliers do these contracts represent? _____

4. Of these contracts how many have a duration longer than 2 years? _____

Note: The term contracts used in the remainder of this survey refers to active contracts which equal or exceed $25,000. This distinction is made for comparison purposes with the Department of Defense where $25,000 is the statutory separation between large contracts, which require greater administration, and small contracts.

Supplier Evaluation

1. What are the top five criteria used by your company to monitor the quality of supplier performance on contracts? (i.e. timely performance, evidence of statistical control, defect rates, management expertise, technical ability, etc.)

1. _____

2. _____

3. _____

4. _____

5. _____

2. For the criteria listed in question one, what mechanisms are in place to monitor compliance (i.e. statistical process control, in plant evaluations, personnel assigned to supplier plants, etc.). Providing existing documentation of these mechanisms would be ideal.

3. In general, how often do you review supplier performance on contracts?

Contract Administration Organization

1. How is your contract management organization configured? (An organization diagram and job descriptions would be most helpful)

2. How large is your supplier monitoring work force?

3. How is your supplier monitoring work force structured (by commodity, contract size, etc)?

4. How do you determine the size of your contract monitoring work force (ratio of personnel to active contracts, dollar amount of contracts, percentage of sales, etc)?

Supplier Monitoring Initiatives

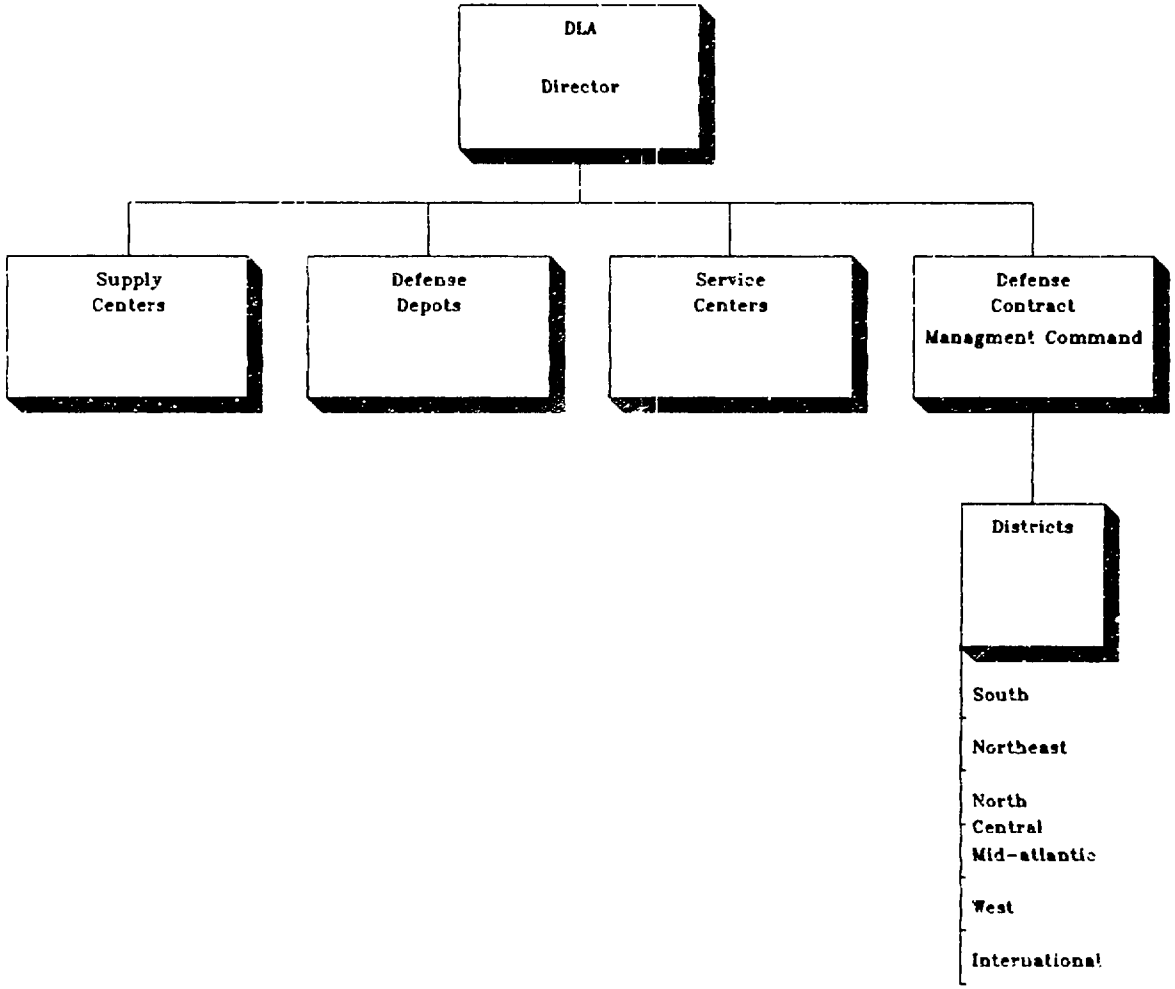
1. What initiatives has your company taken in the past five years to monitor and improve supplier quality? Providing documentation of existing programs would be very helpful.

2. Are there any other initiatives you have implemented which affect supplier performance (i.e. supplier recognition programs, supplier training programs, etc)? If yes, please describe the program and provide documentation.

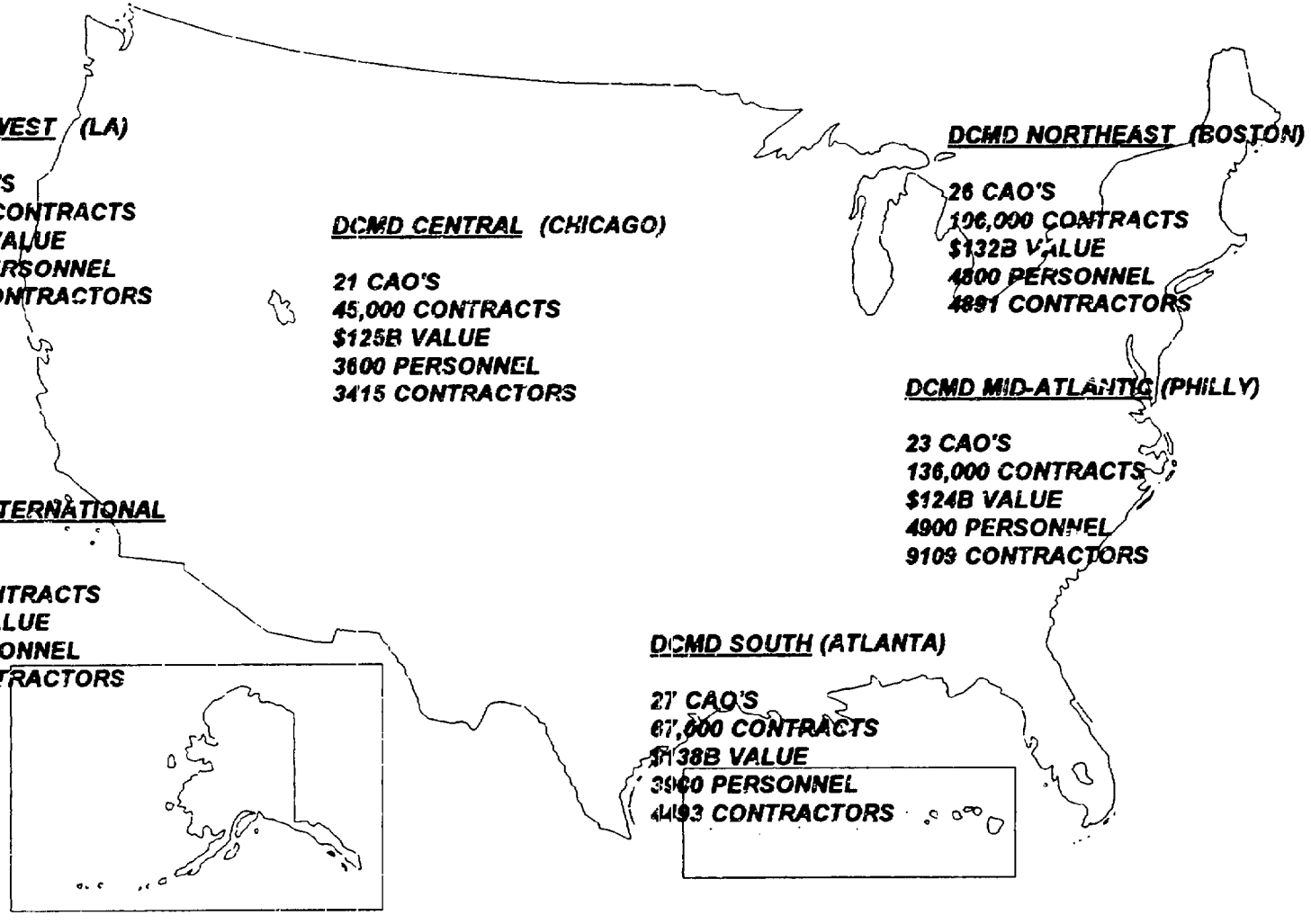
3. This survey is aimed at benchmarking contract monitoring and contract management organizations in private industry for application to Government contracting. Based on your experience, what initiatives do you feel the Government should pursue to improve their monitoring of suppliers?

DEFENSE LOGISTICS

AGENCY



DEFENSE CONTRACT MANAGEMENT COMMAND



DCMAO San Francisco
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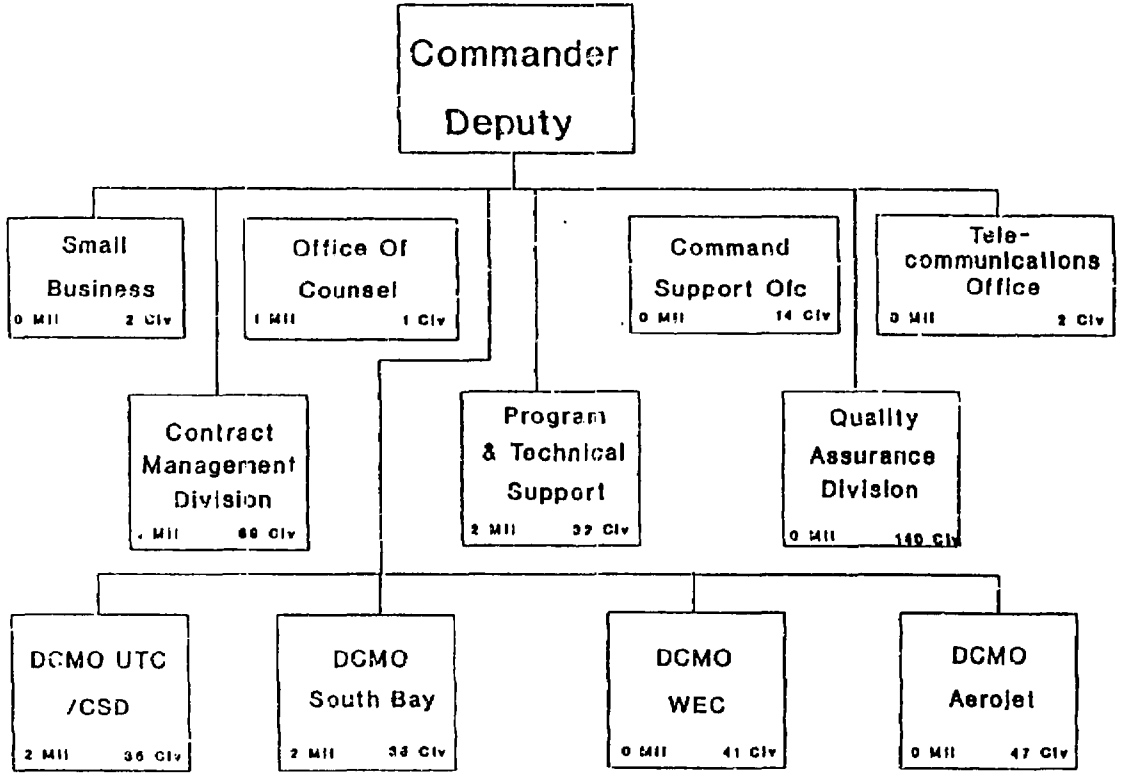

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